Unocal Corporation

San Luis Obispo, California

Corrective Action Plan

Former Unocal Bulk Distribution
Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

ENSR Corporation
June 30, 2005
06940-362-130

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Prepared for:

Unocal Corporation
San Luis Obispo, California

Prepared by:

ENSR Corporation
1420 Harbor Bay Parkway, Suite 120
Alameda, California 94502

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This Corrective Action Plan was prepared consistent with currently and generally accepted environmental consulting principles and practices. The material and data in this report were prepared under the supervision and direction of the undersigned.

ENSR Corporation

Kristin Mancini, E.I.T.
Staff Engineer

D. N. Peacock, Ph.D., P.G.
Senior Project Manager

Kent Baugh, Ph.D., R.C.E. No. 28941
Senior Program Manager

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LIST OF ACRONYMS AND ABBREVIATIONS

APNs	Assessor Parcel Numbers
ASTs	aboveground storage tanks
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and total xylenes
CAP	Corrective Action Plan
Clayton	Clayton Services Group, Pleasanton, California
CAM 17 Metals	California Code of Regulations (CCR) Title 22 list of 17 heavy metal described in the California Administrative Manual or CCR
CCR	California Code of Regulations
Clayton's Revised Feasibility Study	"Feasibility Study and Health Risk Assessment (Rev 1.0) for Old Towne Subdivision, 1051 Spencer Avenue, Santa Rosa, CA" prepared by Clayton Services Group, Pleasanton, California, dated August 15, 2003
ENSR	ENSR Corporation
ft/ft	feet per foot
GAC	Granular Activated Carbon
Gaddis	Gaddis Nursery
HHRA	Human Health Risk Assessment
ISGR	In-situ Groundwater Remediation
MTBE	methyl tertiary butyl ether
NCWB	North Coast Water Board
OEHHA	Office of Environmental Health Hazard Assessment
PCBs	polychlorinated biphenyls
PID	Photoionization detector
ppm	parts per million
RAP	Remedial Action Plan
Site	Union Oil Company of California Facility No. 1975 site at 1051 Spencer Avenue, Santa Rosa, California
SVOCs	semi-volatile organic compounds
TPHd	Total Petroleum Hydrocarbons as diesel
TPHg	Total Petroleum Hydrocarbons as gasoline
Unocal	Union Oil Company of California
Unocal Plant	the former Unocal Bulk Distribution Plant No. 1975
US EPA	United States Environmental Protection Agency
UST	underground storage tank
VOCs	volatile organic compounds
µg/L	micrograms per liter

EXECUTIVE SUMMARY

This report is a Corrective Action Plan (CAP) for the former Unocal bulk petroleum storage and distribution facility No. 1975 that was located at 1051 Spencer Avenue, Santa Rosa, California (Site). Included in this report is an identification and evaluation of potential remedial technologies applicable to achieve closure goals given the Site-specific conditions. The evaluations were performed in accordance with the California Code of Regulations, Title 23, Division 3, Chapter 16, Article 11, Section 2725 as required by the North Coast Water Board (NCWB) in a letter dated June 22, 2004 to Unocal.

Besides Unocal's former distribution facility, Gaddis Nursery (Gaddis) formerly occupied the Site. Currently, the Site comprises the Old Towne Subdivision developed in 1989 as a 31-unit single-family residential neighborhood. From the 1900s to 1979, Unocal operated the bulk petroleum distribution facility which occupied approximately the central portion of the current subdivision. Bulk petroleum storage and distribution from aboveground storage tanks (ASTs) occurred until the 1950s, at which time the petroleum fuel storage was placed underground. The seven underground storage tanks (USTs) were removed in June 1976. Around 1934, Gaddis operations began on the southwest portion of the Site and expanded over time to eventually occupy most of the current subdivision. Following the removal of the bulk distribution facility's tanks and other structures, Unocal transferred ownership of the property to Gaddis by deed grant.

There are 13 groundwater monitoring wells associated with this Site. The chief constituents of concern are total petroleum hydrocarbons as gasoline (TPHg), total petroleum hydrocarbons as diesel (TPHd), and benzene. Currently, methyl tertiary butyl ether (MTBE) is not a constituent of concern. There are two water bearing zones beneath the Site separated by an aquitard of silty clay. The magnitude of the groundwater gradient in the shallow water-bearing zone has ranged from 0.001 to 0.006 feet per foot with the groundwater flow direction predominantly to the southwest. The depth to water ranges from approximately 5 to 15 feet below ground surface (bgs) with a seasonal variation of approximately 10 feet.

Dissolved hydrocarbons appear to be restricted to the shallow water-bearing zone. Petroleum hydrocarbons have been consistently detected only in groundwater samples from monitoring wells MW-2, MW-3, and MW-11. From 1994 through 2005, no petroleum hydrocarbons were detected in groundwater samples collected and analyzed from the deep monitoring well DW-1. Ongoing groundwater monitoring indicates one area of petroleum hydrocarbon impact remaining at the center of the Site extending from MW-2 down gradient to MW-3.

In developing a recommended remedial approach for hydrocarbons in groundwater, the following are presented herein:

- The historical information and current Site utilization, and the limitation resulting from current Site use on implementing many remedial technologies feasible for hydrocarbon-impacted groundwater.

- The existing site conceptual model, which was based on a previous submittal in 2003 to the NCWB from the Clayton Services Group.
- The chemicals of concern are TPHg, TPHd, and benzene in the shallow groundwater.
- Remedial technologies for the shallow groundwater were evaluated and compared based on effectiveness, implementability, and relative cost.
- Based on the evaluation of remedial technologies, two remedial alternatives were developed, and capital and annual cost estimates were prepared and evaluated relative to achievement of the Site-specific groundwater cleanup criteria provided by the NCWB in a letter dated June 22, 2004.

The remedial alternatives screened and compared were In-situ Groundwater Remediation and Enhanced In-situ Bioremediation (EIB). Based on the evaluations described in this CAP, the most cost effective and technically feasible remedial alternative recommended by ENSR is EIB. This alternative includes the installation of five 6-inch diameter wells with a patented Waterloo oxygen diffuser to treat groundwater in the areas where residual dissolved phase hydrocarbons are currently observed.

In addition, in a letter dated June 22, 2004, the NCWB requested additional investigative work in the area of Unocal's former AST slabs to determine current hydrocarbon concentrations in the unsaturated zone soil. ENSR proposes to advance three soil borings in the vicinity of the former ASTs to collect soil samples from the unsaturated zone. The results from this soil investigation will be evaluated relative to criteria from the human health risk assessment and the potential for residual hydrocarbons to impact groundwater.

1.0 INTRODUCTION

Union Oil Company of California (Unocal) has retained ENSR Corporation (ENSR) to prepare this Corrective Action Plan (CAP) for the former Unocal bulk petroleum storage and distribution facility located at 1051 Spencer Avenue, Santa Rosa, California (Site) as depicted in **Figure 1** – Site Location Map and **Figure 2** – Site Plan. This CAP is being submitted under Cleanup and Abatement Order No. 97-45 issued by the North Coast Water Board (NCWB).

Clayton Services Group of Pleasanton, California, (Clayton) previously performed a significant amount of work at the Site. The findings of their investigations are referenced in their Feasibility Study and Risk Assessment Report (Clayton 2003) submitted to the NCWB. This report included a summary of site investigation activities of soil, groundwater, and soil vapor, an updated sensitive receptor survey, findings from performing a fate-and-transport model study to estimate groundwater cleanup times under natural attenuation conditions, a feasibility study, and a Human Health Risk Assessment (HHRA). The NCWB provided written comments on Clayton's 2003 report and requested in a letter dated April 9, 2004, that an addendum be prepared to the Health Risk Assessment to evaluate additional groundwater exposure scenarios. ENSR submitted an addendum to the HHRA (ENSR, 2004b) in response to the April 9, 2004 letter from the NCWB. In a letter dated June 22, 2004, NCWB provided further comments on the Clayton 2003 report and the ENSR HHRA addendum, stating that:

1) The issuance of a no further action letter is not appropriate at this time,
2) The remedial alternative of enhanced in-situ bioremediation was an acceptable method of compliance, and
3) Additional soil sampling would be required in the area of Unocal's former aboveground storage tanks to investigate current contaminant levels.

The objective of this CAP is to identify and evaluate remedial technologies and identify a remedial action alternative that will adequately protect human health, safety, and the environment, and will restore or protect current or potential beneficial uses of groundwater at the Site. This CAP has been prepared in accordance with Article 11 of the California Code of Regulations (CCR), Title 23, Division 3, and Chapter 16. As such, this CAP includes the following elements:

- An evaluation of site conditions and the extent of reported residual contamination impacts (Clayton, 2003) and subsequent groundwater monitoring.
- Identification of site specific clean up levels for groundwater and a description of the best remedial alternatives applicable to current Site conditions that have the potential to achieve these levels.
- A technology screening based on site investigations and an evaluation based on feasibility, implementability, and cost effectiveness.
- Identification of a remedial alternative best applicable to the Site and an approximate implementation schedule.

This CAP is composed of the following sections:

Section 2.0 – SITE BACKGROUND AND CONDITIONS provides a summary of the historical activities, investigations, and remedial actions taken at the Site.

Section 3.0 – CURRENT SITE CONDITIONS AND CONCEPTUAL SITE MODEL provides an interpretation of the data and projects what the mechanism(s) may have been for known releases to have impacted affected media.

Section 4.0 – CLEANUP CRITERIA identifies site specific groundwater cleanup goals.

Section 5.0 – FEASIBILTY STUDY presents potential remedial technologies to achieve cleanup goals and provides a screening to determine the remedial approach most appropriate for the Site.

Section 6.0 – CORRECTIVE ACTION PLAN IMPLEMENTATION presents the schedule for completing the activities identified in this CAP.

Section 7.0 – REFERENCES

2.0 SITE BACKGROUND AND CONDITIONS

2.1 Site Location and Description

The Old Towne Subdivision is an approximately 1.5-acre site that was developed in 1989 as a 31-unit single-family residential neighborhood. The subdivision is bordered by Spencer Avenue to the south, Wright Street to the west, Pacific Avenue to the north, and North Street to the east (**Figure 2**). The current property divisions and Sonoma County Assessor Parcel Numbers (APNs) for those properties located within the boundaries of the former Unocal Site are also presented on **Figure 2.**

The former Unocal Bulk Distribution Plant No. 1975 (Unocal Plant) and Gaddis Nursery (Gaddis) formerly occupied the subdivision site. The Unocal Plant was located approximately in the central portion of the subdivision and operated as a bulk petroleum distribution facility from the early 1900s to 1976. The Unocal facility occupied all or part of land identified as Sonoma County APNs 12-155-28, 29, 30, 31, 32, 33, 38, 39, 40, 43, 44, and 45.

Bulk petroleum storage and distribution from aboveground storage tanks (ASTs) located on and around parcel 12-155-31 occurred until the 1950s, at which time the petroleum fuel storage was placed underground (three 12,000-gallon and four 10,000-gallon underground storage tanks [USTs]) at locations on and around parcel 12-155-40. The locations of the former Unocal Plant and structures are shown in **Figure 2**.

Clayton (2003) referenced a blueprint of the bulk plant, title "Office Alterations, Marketing Station, Wright Street" (dated September 22, 1961: Revision 1 December 31, 1962), used to identify the locations of fuel storage tanks operated by Unocal. An area denoted as "old tank slab" was located at the northeastern corner of the Unocal property on North Street (APNs 12-155-31 and 53) and was the prior location of the ASTs. The Unocal blueprint identified the location of the seven USTs as the "UST tank slab". These USTs were located about 100 feet east of the western facility boundary on Wright Street (APN 12-155-40).

The seven USTs were removed from the tank slab area by Petroleum Engineering in June 1976 and transported to a new bulk plant on Todd Road in Santa Rosa. Following the removal of the bulk plant tanks and other facilities, Unocal transferred ownership of the property to Gaddis by deed grant. The Gaddis facility expanded over time to eventually occupy most of the subdivision property.

Around 1934, Gaddis operations began on the southwest portion of the subdivision site encompassing all or portions of APNs 12-155-23, 34, 35, 36, 37, 38, 46, 47, 48, 49, 50, 51, 52, and 53. With the 1976 acquisition, Gaddis acquired the property encompassing the Unocal Plant and APNs 12-155-24, 25, 26, 27, 28, 41, and 42.

Around 1962, the nursery installed a 500-gallon UST on parcel 12-155-50 (1069 Spencer Avenue). A second 250-gallon UST was installed around 1965 and was located near what is now the center of Gaddis Court. A third 1,000-gallon UST was installed around 1979 and was located partially on parcel 12-155-40 and the street of Gaddis Court. The USTs were reportedly used to store gasoline.

The three USTs were removed by Petroleum Engineering in 1987. Low concentrations of gasoline-related hydrocarbons were detected in confirmation soil samples.

In addition to the USTs operated by Gaddis, Gaddis responded to a NCWB questionnaire and indicated that stove oil was stored in a 250-gallon AST, and motor oil was stored in a 55-gallon drum at the Site.

2.2 Geology and Hydrogeology

The site geologic and hydrogeologic characterization, as summarized below, was previously completed and reported by Clayton (2003).

2.2.1 Geology

The immediate surface cover of the Site consists of residential housing, asphalt-paved roadways, concrete sidewalks and driveways, and landscaped areas surrounding residences. Based upon the information reported by Clayton (2003), subsurface soils to depths of approximately 13 to 15 feet below ground surface (bgs) consist mostly of brown, plastic, silty clay and clayey silt. Fine sand and gravel stringers occur throughout the fine-grained sediments. In the area of the former Gaddis 1,000-gallon UST and Unocal USTs (APNs 12-155-39 and 40), soil was excavated to approximately 10.5 feet bgs. Each excavation was filled with boulders at the base and completed to surface with silty clay borrow compacted to 90-percent relative compaction. Sandy gravel was identified in monitoring well MW-9 from 6 feet to 19.5 feet bgs.

Below the silty clay is the first water-bearing zone, which is predominantly silty/clayey sand with a thin gravel base. This water-bearing unit ranges in thickness from about 2 feet to 8 feet (see **Figures 3 and 4**). The first water-bearing unit is underlain by mottled brown silty clay. The clay layer was only penetrated in borehole DW-1 and was approximately 3 feet in thickness. Within borehole DW-1, a second water-bearing zone was encountered from approximately 29 feet to 38 feet bgs. The second water-bearing zone consisted of dense, sandy gravel and sand. The borehole was terminated at 41 feet bgs in a brown silty clay.

2.2.2 Hydrogeology

Groundwater level measurements have been collected at the Site for approximately 12 years (Clayton, 2003). The magnitude of the groundwater gradient has ranged from 0.001 to 0.006 feet per foot (ft/ft) with the groundwater flow direction predominantly to the southwest. Periodically, a groundwater mound was observed in the vicinity of APNs 12-155-39 and 40 (the area of former over-excavation activities) that may be due to a water leak or irrigation of the residential yards. The depth to water was reported to vary seasonally throughout the Site and ranges from approximately 3 feet to 15 feet bgs.

Clayton reported that the variation in the depth to water shows that groundwater within the shallow aquifer exists under semi-confined (fully saturated) to unconfined (partially saturated) conditions.

These seasonally driven fluctuations in groundwater conditions act to cyclically dilute and concentrate hydrocarbons within the shallow groundwater. Under semi-confined (fully saturated) conditions the volume of water within the shallow groundwater is at a maximum and hydrocarbon concentrations are diluted. Under unconfined conditions, the volume of water present in the shallow groundwater is reduced and hydrocarbon concentrations increase.

2.3 Previous Site Activities

Previous UST removal activities and site investigations have been conducted at the Site, beginning in 1976. For additional details including analytical results, please refer to the report by Clayton (2003). A summary of these activities is presented below.

2.3.1 Soil Investigation and UST Removal Activities

As part of a geotechnical investigation during 1987, a slight petroleum odor was detected in two soil samples collected from boring B-3 at depths of 7 feet and 12 feet bgs. Boring B-3 was installed on the property now defined as 1082 Gaddis Court. Subsequently, three gasoline USTs (one 1,000-gallon, one 500-gallon, and one 250-gallon) were excavated and removed from the Site. Soil confirmation samples taken from the base (approximately 7 feet bgs) of the UST excavations contained low concentrations of gasoline-related hydrocarbons. The area around the former 1,000-gallon tank was over-excavated and the soil removed to a depth of approximately 10.5 feet bgs.

In June of 1989, additional soil was excavated in the area of the former Unocal "UST tank slab" located on two contiguous parcels, APN 12-155-39 (south of 1028 Gaddis Court) and APN 12-155-40 (west and downgradient of the Gaddis 1,000-gallon UST). The soil was excavated to approximately 10.5 feet bgs and reported to consist (at that time) of recent fill materials, clayey soils, and fine-grained sands with blocks of concrete. The excavated soil was placed on plastic sheeting on the adjacent lots.

These soil stockpiles were moved several times and allowed to aerate. Initial soil analysis indicated that stockpiled soils were impacted with total petroleum hydrocarbons as gasoline (TPHg) at levels up to 1,200 parts per million (ppm). Subsequent testing of the stockpiled soil indicated that TPHg levels had dropped to 19 ppm or less. The aerated soil was transported to the Sonoma County Class 3 landfill. The excavation was backfilled with a layer of boulders at the base, and approved imported borrow material was placed on top of the boulders to grade and compacted to 90-percent relative compaction or better. Based on the analytical results, Clayton (2003) stated that "it would appear that most of the petroleum hydrocarbon impacted soil in the area of the former Unocal and Gaddis USTs was excavated and removed from the subsurface."

2.3.2 Previous Environmental Site Investigations by Clayton

Clayton performed extensive site sampling and the findings of their investigations were previously reported (Clayton, 2003). As part of their investigations, 12 shallow monitoring wells (each identified as "MW", each about 20 feet deep) and one deep monitoring well (identified as "DW-1", about 40 feet deep) were installed at both on-site and off-site locations at locations shown on **Figure 2**. A geologic cross-section was prepared by Clayton and is presented as **Figure 4**. This cross-section traverses the Site in a northwest – southeast direction, perpendicular to the groundwater flow (**Figure 3**).

The completed groundwater investigations and subsequent monitoring indicate that the monitoring well network appears to have adequately defined the extent of the dissolved-phase hydrocarbon contamination potentially resulting from previous Unocal operations, and covers an area of approximately 800 feet by 600 feet. Clayton began monitoring groundwater quality during 1991 and continued through September 2003. As part of the analytical suite, groundwater samples were collected and analyzed for TPHg, total petroleum hydrocarbons as diesel (TPHd), benzene, toluene, ethylbenzene, total xylenes (BTEX), total lead, and nitrates. During 1999, methyl tertiary butyl ether (MTBE) was added to the suite of analyses, as requested by the NCWB.

Many soil samples have been collected by Clayton for analysis of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), TPHg, TPHd, pesticides, herbicides, polychlorinated biphenyls (PCBs), and CAM 17 metals.

2.3.3 Addendum to Clayton's Health Risk Assessment (Rev. 1.0) by ENSR

On behalf of Clayton, RATECH Resources conducted a HHRA on the Old Towne Subdivision in Santa Rosa, California (Clayton, 2003). The HHRA evaluated both soil and groundwater, and concluded that residents living in the area did not face unacceptable risks from petroleum-related chemicals in soil and groundwater. On April 9, 2004, the NCWB and the Office of Environmental Health Hazard Assessment (OEHHA) provided comments on the HHRA. ENSR responded to these comments in an addendum to the HHRA (ENSR, 2004b). The addendum to the HHRA by Clayton (2003) incorporated a more detailed evaluation of potential residential exposure to groundwater.

Clayton (2003) concluded that groundwater beneath the Site is currently not being used for any purpose; therefore, there is no direct exposure to groundwater. However, in accordance with a comment from the NCWB, ENSR considered the possibility that groundwater could be used in the future. It is possible that in the future, people could install wells and use the groundwater for drinking, or other beneficial uses, such as filling a swimming pool or watering a lawn. To evaluate the drinking water pathway, chemical concentrations in groundwater were compared to California's drinking water standards. The maximum detected concentrations of several chemicals (benzene, total petroleum hydrocarbons, ethylbenzene, and bis(2-ethylhexyl)phthalate) are higher than their respective drinking water standards, indicating that the groundwater should not be used as a drinking water source. However, the findings of ENSR's risk assessment indicated that groundwater used for non-consumptive uses, such as filling swimming pools and watering lawns, does not result in significant adverse health effects.

The addendum to the HHRA by ENSR (2004b) was submitted to the OEHHA. This addendum evaluated if the residual petroleum remaining in the soil and groundwater poses a risk to those who live or work in the Old Towne Subdivision. A second addendum to the HHRA was submitted by ENSR (2005) in response to questions and comments from OEHHA and the NCWB. The results of the HHRA and its two addenda indicated that the potential risks posed by existing hydrocarbon concentrations in soil and soil vapor are below the US EPA risk thresholds. The HHRA concluded that groundwater under present conditions should not be used for drinking water, since several chemicals (benzene, TPHg, TPHd, ethylbenzene, and bis(2-ehylhexyl)phthalate) are higher than their respective California drinking water standards.

2.3.4 Sensitive Receptor Survey

Clayton (2003) referenced an "Updated Sensitive Receptor Survey" dated February 7, 2003, submitted to the NCWB for the Old Towne Subdivision, Santa Rosa, California. This survey reportedly involved completing the following tasks for an area encompassing a 1,200-foot radius surrounding the Site:

- Identify sensitive habitats,
- Locate surface water bodies,
- Identify utility trenches, vaults or basements,
- Identify high-risk human populations,
- Locate domestic and municipal water supply wells,
- Develop a plan for sampling domestic wells, and
- Report preparation.

Clayton stated that there were no sensitive habitats, surface water bodies, high-risk human populations, or water supply wells within the 1,200-foot radius. At the request of the NCWB, Clayton sampled the following two nearby and accessible off-site groundwater wells in May 2003:

- 1120 Neale Drive, sampled May 16, 2003 – The property has a working pump that extracts groundwater from an on-site well and transfers water to the backyard irrigation system and hose spigot.

- 822 Wright Street, sampled May 21, 2003 – The property has a private well and pump on site that have not been used for almost 9 years according to the property owner.

Clayton (2003) presented details of the private off-site groundwater well sampling as presented in a submittal to the NCWB by Clayton, entitled "*Addendum to Updated Sensitive Receptor Survey Report*" and dated August 6, 2003. The results of the analyses indicated no detectable concentrations of VOCs, SVOCs, TPHg, TPHd, or fuel oxygenates in the groundwater samples. Metals and total dissolved solids were found at concentrations consistent with background levels.

2.3.5 Groundwater Monitoring Event – First Half of 2005

As part of the ongoing groundwater monitoring program, ENSR performed a groundwater sampling event on March 23, 2005, which also included a synoptic water level round. This information was submitted to the NCWB in a letter report dated April 19, 2005. As part of the event, each of the 12 monitoring wells (MW-1 through MW-12) and DW-1 were gauged to record depth to groundwater, which provided the data necessary to construct a groundwater elevation contour map (**Figure 5**). On March 23, 2005, the groundwater flow direction was south to southwest with an average hydraulic gradient of approximately 0.004 to 0.005 ft/ft. This flow direction is consistent with historic flow directions reported by Clayton.

Groundwater samples were collected by ENSR from monitoring wells MW-2, MW-3, and MW-11 for analysis of TPHg, TPHd, VOCs, SVOCs, CAM 17 metals, and ethanol. Groundwater monitoring data and analytical results are summarized in **Tables 1** through **5**. Historical groundwater monitoring data and analytical results are included in **Attachment B**. **Figure 6** depicts dissolved concentrations of TPHg, benzene, and MTBE detected in groundwater during the March 2005 sampling event.

The groundwater elevation rose approximately 11 feet as measured in March 2005, relative to the September 2004 monitoring and sampling event. Typical seasonal water level fluctuations over the monitoring history are on the order of approximately 8 feet. The groundwater contours shown in **Figure 5** do not indicate localized changes in gradient and flow direction that might be caused by operation of a nearby municipal or domestic well. The observed increase in groundwater elevations appears to be regional and seasonal in nature. TPHd was detected in MW-2 and MW-11. TPHg was detected in MW-2 and MW-3. Lead was not detected above 5.0 micrograms per liter (µg/L) in the wells sampled. In MW-2, 2-methyl naphthalene and naphthalene were detected at levels of 32 µg/L and 17 µg/L, respectively. VOCs were not detected in MW-11. VOC concentrations in MW-2 and MW-3 were significantly lower than in the previous round of sampling in September 2004 but similar to levels seen in March 2004. VOC concentrations seem to decrease as the groundwater elevation increases. CAM 17 dissolved metal analytical results were similar to samples taken in March 2004, with arsenic and barium being reported above the detection limits. Ethanol was detected in MW-2, MW-3, and MW-11 at concentrations of 19 µg/L, 18 µg/L, and 12 µg/L, respectively.

3.0 CURRENT SITE CONDITIONS AND CONCEPTUAL SITE MODEL

3.1 Current Site Conditions

Clayton (2003) reported that two soil samples collected from location SV-9 had concentrations of TPHd greater than 1,000 ppm and two soil samples had concentrations of TPHg greater than 100 ppm. Location SV-9 was at the location of the former AST tank slabs. A soil investigation is proposed as part of this CAP to assess if hydrocarbons are present in the unsaturated zone soils around the eastern edge of the former ASTs. Groundwater monitoring has been performed at the Site for approximately 14 years (1991 through 2005). During this time, an extensive database has been developed to demonstrate the nature and extent of hydrocarbon-impacted groundwater at the Site. A summary of historical groundwater analytical data is presented in **Appendix B** and the trend plots are presented in **Appendix C**. The information presented in **Appendix C,** specifically Figures 7A and 7B (obtained from Clayton, 2003), show the distribution of TPHg in groundwater in September of 1992, 1995, 2000, and 2002. These figures show that the lateral extent of TPHg in groundwater has decreased and the concentration of TPHg has declined over time.

Dissolved hydrocarbons appear to be restricted to the shallow or first encountered water-bearing zone. No petroleum hydrocarbons were detected in groundwater samples collected and analyzed from the deep monitoring well DW-1 over a 10-year period (1994 through 2004).

3.2 Hydrocarbon Trends in Groundwater

Petroleum hydrocarbons have been consistently detected only in monitoring wells MW-2, MW-3, and MW-11. The data presented in **Appendix C**, specifically Figures 8 and 9, show the changes in groundwater elevation and the changes in TPHg and benzene concentrations over time for monitoring wells MW-2 and MW-3, respectively. As can been seen from these figures, the general trend is a decrease in TPHg and benzene concentrations in these monitoring wells. Additionally, when groundwater levels are high due to seasonal fluctuations, TPHg and benzene concentrations are low, and concentrations show increases when water levels decline to the seasonal low. The seasonal changes in hydrocarbon concentrations are suspected to result from dilution effects as groundwater levels seasonally rise and fall.

3.3 Former AST Slab Proposed Soil Investigation

The NCWB (2004b) has requested additional soil characterization in the area of the former AST slabs near North Street. Soil samples collected in 1993 near the AST slabs indicated gasoline concentrations up to 730 ppm and diesel concentrations up to 4,600 ppm, at depths of 10.5 to 11 feet bgs.

To collect soil samples from the unsaturated zone, ENSR proposes to advance three soil borings in the vicinity of Unocal's former AST slabs, located in the public access area between North Street and 1082 Gaddis Court. The soil data will be used to evaluate if petroleum hydrocarbons are present in the unsaturated zone soils, and if present, are the hydrocarbons potentially being leached into the groundwater.

Based on the historical groundwater monitoring data, depth to groundwater at the Site has ranged from approximately 5 to 15 feet bgs. The soil borings will be advanced to the top of the water table, assumed to be less than 25 feet bgs. For each boring, continuous soil cores will be collected until the total depth has been reached. Soils in each boring will be logged according to the Unified Soil Classification System (USCS) visual and manual methods, and soil samples will be screened in the field with a portable photoionization detector (PID). Boring logs containing PID readings, USCS descriptions, and other pertinent drilling information will be constructed.

Soil samples will be collected for both chemical and physical properties analyses. ENSR proposes to collect three soil samples from each boring for laboratory analysis. These soil samples will be collected based on the following criteria: a) the most impacted soil based on field observations (i.e., visual, olfactory, or highest PID reading) and, b) soil samples collected at the same interval above and below the most impacted sample. If the field observations do not identify a most impacted soil zone in a boring, a soil sample will initially be collected at a depth of 5 feet bgs, and at 5 foot intervals thereafter. The soil samples will be submitted to a California state-certified laboratory for analyses of BTEX, TPHg, and MTBE using EPA Method 8260B, and TPHd by Method 8015M with and without a silica gel cleanup.

After collecting the soil samples, the borings will be sealed with a neat cement grout placed from the bottom to a depth of 6 inches below the ground surface. Depending on surface conditions, the final 6 inches of backfill will be placed to match the surrounding groundcover.

4.0 CLEANUP CRITERIA

4.1 Groundwater Cleanup Criteria Objectives

Site-specific cleanup goals have been established by the NCWB as follows:

Chemical Constituent	Cleanup Criteria (µg/L)	Reference
Benzene	0.15	NCWB, 2004b. *Groundwater Water Quality Objectives for Gaddis Nursery Site 2004* included as Enclosure 3 in the NCWB letter dated June 22, 2004.
Toluene	40	
Ethylbenzene	30	
Xylenes	20	
Methyl-tert-butyl-ether (MTBE)	5	

5.0 FEASIBILITY STUDY

The following section summarizes the remedial technologies evaluated and the assumptions relevant to each technology. Based on historical information and current site utilization, a limited set of technologies remain applicable in achieving the site closure goals. The primary limiting factors are:

- Residential land use and associated vapor intrusion concerns,
- Available location(s) for installing aboveground remedial systems, and
- For operation and maintenance of the remedial systems, available areas are limited to those areas with public access, such as sidewalks and public roads.

The Site and immediately surrounding areas are fully developed. Natural attenuation was a potential remedial alternative previously identified by Clayton (2003). The NCWB (2004b) characterized natural attenuation as a "do-nothing" alternative and indicated that such a remedial approach would not be acceptable as a remedial action in a CAP. No previous active groundwater remediation activities have been undertaken on the Site.

5.1 Groundwater Alternative 1: In-situ Groundwater Remediation (ISGR)

This alternative uses ISGR technology, developed by Steve Wilhelm & Associates, Inc., which removes dissolved contaminants from the groundwater using a below ground canister of activated carbon within a recirculation well. In this process, groundwater is captured as it flows to a recirculating well system under the natural gradient, treated in a below-grade granulated activated carbon (GAC) system, and recirculated back into the aquifer. At the surface, the system consists of a manhole linked to a power control box which itself may be below ground. The unobtrusive equipment allows for easy integration into a residential or publicly accessible area. Treatment is performed within the well. Well spacing will be determined by site geology and hydrogeology and is based on the groundwater capture width achievable for an individual well. Three recirculation wells, one located in Gaddis Court, and two along Wright Street, are presently contemplated to treat the impacted area and prohibit contaminant migration. Each recirculation well would be designed and sized for an approximate 150-foot capture width. Using reported groundwater velocity values (Papadopulos, 2001), ENSR estimates recirculation of groundwater through the treatment system to be approximately three times within three years. The following are the major costs associated with this remedial alternative: the design and installation of three ISGR wells; an estimated three years of system operation, maintenance, and monitoring; and site restoration and closure activities. The estimated total cost for this remedial alternative is approximately $520,000.

A potential enhancement to this technology is enhanced natural attenuation by increasing dissolved oxygen levels and ensuring sufficient nutrients for hydrocarbon biodegradation by indigenous microorganisms. Increasing dissolved oxygen levels involves bleeding air or oxygen into the groundwater stream within the below-grade GAC system to increase the dissolved oxygen in the groundwater being recirculated back into the aquifer. Currently Steve Wilhelm & Associates, Inc. is in the testing phase of this technology. The approximate cost for the enhancement of the ISGR wells is $100,000.

5.2 Groundwater Alternative 2: Enhanced In-situ Bioremediation

Enhanced in-situ bioremediation is a technology that stimulates and creates a favorable environment for indigenous microorganisms to degrade organic contaminants in saturated soils and groundwater. This alternative involves enhancing the level of dissolved oxygen in the groundwater using an in-well oxygen diffuser developed by the University of Waterloo. The system would consist of the following:

- Two new 6-inch diameter wells installed in Gaddis Court in a line perpendicular to the groundwater flow;
- Three new 6-inch diameter wells installed in Wright Street in a line perpendicular to the groundwater flow;
- Each well would contain the following:
    - A patented Waterloo emitter (3.88 inches OD with low density polyethylene tubing),
    - A 6 cubic foot oxygen cylinder (3.2 inch diameter and 12 inches in height),
    - A pressure regulator, pressure relief valve, and connection tubing.

Groundwater will be characterized to assess the need for nutrient addition to enhance microbial growth. The implementation of in-situ bioremediation will shorten the timeframe required to achieve water quality objectives by natural attenuation. Installation of the wells in public right-of-way locations will enable periodic replacement of the cylinders while minimizing the nuisance disturbance to residents. The major costs for this alternative include design and installation of the wells for oxygen addition; an estimated three years of system operation, maintenance, and monitoring; and site restoration and closure activities. The estimated total cost for the implementation of this remedial alternative is $450,000. Enhanced in-situ bioremediation was previously recommended by Clayton (2003), and was identified by the NCWB (2004b) as an acceptable remediation method for the Site.

6.0 CORRECTIVE ACTION PLAN IMPLEMENTATION

Based on the evaluation described above, Groundwater Alternative 2 (with the possible need for nutrient enhancement to be determined) is the preferred alternative to achieve cleanup goals in groundwater within a reasonable time frame and at a reasonable cost. The selected alternative includes the installation of five new 6-inch diameter wells with a patented Waterloo oxygen diffuser to treat groundwater in the accessible areas where hydrocarbons have been detected above the cleanup criteria. This alternative will also include the further soil investigation in the area of the former AST slabs as described in Section 3.3. Implementation of the proposed remedial alternative will require the completion of the following activities:

- Acceptance of the proposed remedial approach and soil investigation by the NCWB.
- Completion of the soil investigation in the area of the former AST slabs.
- Collection of design data and preparation of a Remedial Action Plan (RAP) which presents the detailed approach, sequencing and schedule for implementing the selected remedial alternative.
- Completion of contracts and schedules for the various specialized subcontractors that will be utilized to implement the selected remedial alternative.

Once regulatory approval of the proposed remedial alternative is received, completion of the necessary design and subsequent RAP is expected to require two to four months. Once approval of a RAP presenting the details of the implementation of this alternative is received, completion of the subcontractor contracting and scheduling activities associated with implementing this alternative are expected to require three to four months. Depending on any access constraints, availability of key subcontractors and the weather, implementation of this remedial alternative could commence anytime after the preceding activities were completed. Once initiated, installation of the wells is expected to last less then one month followed by operation, maintenance, and groundwater monitoring for an expected three years.

7.0 REFERENCES

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North Coast Water Board (NCWB), 2004a. Letter dated April 9 with Comments on the Human Health Risk Assessment (rev. 1.0) for Old Towne Subdivision, Santa Rosa.

NCWB, 2004b. Letter dated June 22 with Comments on the Feasibility Study and Health Risk Assessment (Rev 1.0).

TABLES

Table 1

Groundwater Monitoring Data and Analytical Results

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL ID/ TOC (ft.)	DATE	DTW (ft.)	GWE (msl)	Product Thickness (ft.)	TPHd (µg/L)	TPHg (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MtBE (µg/L)
MW-1											
169.64*	3/11/2004	4.42	165.22	--	--	--	--	--	--	--	--
	9/20/2004	14.35	155.29	--	--	--	--	--	--	--	--
	3/23/2005	**3.03**	**166.61**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
MW-2											
171.08*	3/11/2004	5.47	165.61	--	450	540	<0.5	<0.5	12	1.2	<1.0
	9/20/2004	15.75	155.33	--	410 [1]	1,400 [2]	8.6	4.9	1,400	170	<0.5
	3/23/2005	**4.60**	**166.48**	**--**	**1,000 [1]**	**1,500 [3]**	**<0.50**	**0.64**	**42**	**5.9**	**<0.50**
MW-3											
170.21*	3/11/2004	5.50	164.71	--	630	960	64	2.8	33	38	<1.0
	9/20/2004	15.40	154.81	--	1,300 [1]	1,600 [2]	140	3.5	17	11	<0.5
	3/23/2005	**4.85**	**165.36**	**--**	**<50**	**98 [3]**	**10**	**<0.50**	**2.6**	**5.7**	**<0.50**
MW-4											
169.99**	3/11/2004	4.85	165.14	--	--	--	--	--	--	--	--
	9/20/2004	15.30	154.69	--	--	--	--	--	--	--	--
	3/23/2005	**3.75**	**166.24**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
MW-5											
170.17**	3/11/2004	4.75	165.42	--	--	--	--	--	--	--	--
	9/20/2004	15.30	154.87	--	--	--	--	--	--	--	--
	3/23/2005	**3.90**	**166.27**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

Table 1

Groundwater Monitoring Data and Analytical Results

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL ID/ TOC (ft.)	DATE	DTW (ft.)	GWE (msl)	Product Thickness (ft.)	TPHd (µg/L)	TPHg (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MtBE (µg/L)
MW-6											
171.35**	3/11/2004	6.48	164.87	--	--	--	--	--	--	--	--
	9/20/2004	17.00	154.35	--	190 [1]	<50	0.73	<0.50	0.74	<1.0	--
	3/23/2005	**6.25**	**165.10**	--	--	--	--	--	--	--	--
MW-7											
171.16**	3/11/2004	6.82	164.34	--	--	--	--	--	--	--	--
	9/20/2004	17.00	154.16	--	180 [1]	<50	<0.50	<0.50	<0.50	<1.0	--
	3/23/2005	**6.85**	**164.31**	--	--	--	--	--	--	--	--
MW-8											
170.75**	3/11/2004	6.27	164.48	--	--	--	--	--	--	--	--
	9/20/2004	16.25	154.50	--	330 [1]	<50	<0.50	<0.50	<0.50	<1.0	--
	3/23/2005	**6.26**	**164.49**	--	--	--	--	--	--	--	--
MW-9											
170.46**	3/11/2004	5.75	164.71	--	--	--	--	--	--	--	--
	9/20/2004	15.85	154.61	--	260 [1]	<50	<0.50	<0.50	<0.50	<1.0	--
	3/23/2005	**5.56**	**164.90**	--	--	--	--	--	--	--	--
MW-10											
171.89**	3/11/2004	6.65	165.24	--	--	--	--	--	--	--	--
	9/20/2004	17.00	154.89	--	210 [1]	<50	<0.50	<0.50	<0.50	<0.50	<0.5
	3/23/2005	**6.35**	**165.54**	--	--	--	--	--	--	--	--

Table 1
Groundwater Monitoring Data and Analytical Results
Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL ID/ TOC (ft.)	DATE	DTW (ft.)	GWE (msl)	Product Thickness (ft.)	TPHd (µg/L)	TPHg (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MtBE (µg/L)
MW-11											
170.43**	3/11/2004	5.00	165.43	--	310	<50	<0.5	<0.5	<0.5	<1.0	<1.0
	9/20/2004	15.15	155.28	--	2400 [1]	<50	<0.50	<0.50	<0.50	<0.50	<0.5
	3/23/2005	**3.65**	**166.78**	--	**420 [1]**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<1.0**	**<0.50**
MW-12											
168.84**	3/11/2004	5.65	163.19	--	--	--	--	--	--	--	--
	9/20/2004	16.50	152.34	--	220 [1]	<50	<0.50	<0.50	<0.50	<0.50	<0.5
	3/23/2005	**5.53**	**163.31**	--	--	--	--	--	--	--	--
DW-1											
171.27**	3/11/2004	6.07	165.20	--	<50	<50	<0.5	<0.5	<0.5	<1.0	<1.0
	9/20/2004	16.70	154.57	--	510 [1]	<50	<0.50	<0.50	<0.50	<0.50	<0.5
	3/23/2005	**5.50**	**165.77**	--	--	--	--	--	--	--	--
QA											
	3/11/2004	--	--	--	--	<50	<0.5	<0.5	<0.5	<1.0	<1.0
	9/20/2004	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<0.5
	3/23/2005	--	--	--	--	**<50**	**<0.50**	**<0.50**	**<0.50**	**<1.0**	**<0.50**

Table 1

Groundwater Monitoring Data and Analytical Results

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

EXPLANATIONS:

Groundwater monitoring data and laboratory analytical results prior to March 16, 2004, were compiled from reports prepared by Gettler-Ryan, Inc.

TOC = Top of Casing
ft. = Feet
DTW = Depth to Water
GWE = Groundwater Elevation
msl = Mean sea level
TPHg = Total Petroleum Hydrocarbons as Gasoline
TPHd = Total Petroleum Hydrocarbons as Diesel

B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes
MtBE = Methyl tertiary butyl ether
µg/L = Micrograms per Liter

ND = Not Detected
-- = Not Measured/Not Analyzed
D = Duplicate Sample
QA = Quality Assurance/Trip Blank

* TOC elevations have been surveyed relative to msl, in 1991

** TOC elevations have been surveyed relative to msl, in 1994

[1] Although sample contains compounds in the retention time range associated with diesel, the chromatogram was not consistent with the expected chromatographic pattern or "fingerprint". However, the reported concentration is based on diesel.

[2] Although sample contains compounds in the retention time range associated with gasoline, the chromatogram was not consistent with the expected chromatographic pattern or "fingerprint". However, the reported concentration is based on gasoline.

[3] Weathered gasoline.

Table 2

Groundwater Analytical Results - Semi-Volatile Organic Compounds. Pesticides Dissolved Lead

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL ID	DATE	Bis(2 ethylhexyl) phthalate (µg/L)	2-Methyl naphthalene (µg/L)	Naphthalene (µg/L)	OCL Pesticides (µg/L)	Dissolved Lead (µg/L)
MW-1	3/11/2004	--	--	--	--	--
	9/20/2004	--	--	--	--	--
	3/23/2005	--	--	--	--	--
MW-2	3/11/2004	<10	<10	13	--	<5.0
	9/20/2004	<10	<10	<10	--	<5.0
	3/23/2005	**<10**	**32**	**17**	--	**<5.0**
MW-3	3/11/2004	<10	15	15	--	<5.0
	9/20/2004	<10	<10	<10	--	<5.0
	3/23/2005	**<10**	**<10**	**<10**	--	**<5.0**
MW-4	3/11/2004	--	--	--	--	--
	9/20/2004	--	--	--	--	--
	3/23/2005	--	--	--	--	--
MW-5	3/11/2004	--	--	--	--	--
	9/20/2004	--	--	--	--	--
	3/23/2005	--	--	--	--	--
MW-6	3/11/2004	--	--	--	--	--
	9/21/2004	--	--	--	--	--
	3/23/2005	--	--	--	--	--

Table 2

Groundwater Analytical Results - Semi-Volatile Organic Compounds. Pesticides Dissolved Lead

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL ID	DATE	Bis(2 ethylhexyl) phthalate (µg/L)	2-Methyl naphthalene (µg/L)	Naphthalene (µg/L)	OCL Pesticides (µg/L)	Dissolved Lead (µg/L)
MW-7	3/11/2004	--	--	--	--	--
	9/20/2004	--	--	--	--	--
	3/23/2005	--	--	--	--	--
MW-8	3/11/2004	--	--	--	--	--
	9/20/2004	--	--	--	--	--
	3/23/2005	--	--	--	--	--
MW-9	3/11/2004	--	--	--	--	--
	9/20/2004	--	--	--	--	--
	3/23/2005	--	--	--	--	--
MW-10	3/11/2004	--	--	--	--	--
	9/20/2004	--	--	--	--	--
	3/23/2005	--	--	--	--	--
MW-11	3/11/2004	<10	<10	<10	--	<5.0
	9/20/2004	--	--	--	--	<5.0
	3/23/2005	--	--	--	--	**<5.0**
MW-12	3/11/2004	--	--	--	--	--
	9/20/2004	--	--	--	--	--
	3/23/2005	--	--	--	--	--
DW-1	3/11/2004	39	<10	<10	--	--
	9/20/2004	<10	<10	<10	ND	<5.0
	3/23/2005	--	--	--	--	--

Table 2

Groundwater Analytical Results - Semi-Volatile Compounds, Pesticides Dissolved Lead

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

EXPLANATIONS:

µg/L = Micrograms per Liter
-- = Not Analyzed
ND = Not Detected

ANALYTICAL METHODS:

EPA Method 8270C for Semi-Volatile Organic Compounds

Table 3

Groundwater Analytical Results - Volatile Organic Compounds

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL ID	DATE	Benzene (µg/L)	n-BB (µg/L)	sec-BB (µg/L)	EB (µg/L)	IPB (µg/L)	p-IPT (µg/L)	M Chlor (µg/L)	NAPHT (µg/L)	n-PB (µg/L)	Toluene (µg/L)	1,2,4-TCB (µg/L)	TCE (µg/L)	1,2,4-TMB (µg/L)	1,3,5-TMB (µg/L)	Xylenes (µg/L)
MW-1	3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-2	3/11/2004	<0.5	8.4	3.3	12	12	<0.50	<0.50	12	32	<0.50	<0.50	<0.50	0.63	0.53	1.2
	9/20/2004	8.6	51	26	1,400	260	7.0	<0.50	430	380	4.9	0.79	<0.50	120	110	170
	3/23/2005	**<0.50**	**52**	**17**	**42**	**60**	**0.59**	**<0.50**	**5.1**	**150**	**0.64**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**5.9**
MW-3	3/11/2004	64	9.1	2.4	33	22	<0.50	<0.50	10	50	2.8	<0.50	<0.50	27	9.9	38
	9/20/2004	140	14	9.5	17	54	<0.50	<0.50	18	110	3.5	<0.50	<0.50	7.2	3.3	11
	3/23/2005	**10**	**0.64**	**<0.50**	**2.6**	**2.2**	**<0.50**	**<0.50**	**4.6**	**4.3**	**<0.50**	**<0.50**	**<0.50**	**0.97**	**0.54**	**5.7**
MW-4	3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/21/2004	0.73	<0.50	<0.50	0.74	<0.50	<0.50	0.80	2.6	1.2	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
	3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/20/2004	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.65	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
	3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 3

Groundwater Analytical Results - Volatile Organic Compounds

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL ID	DATE	Benzene (µg/L)	n-BB (µg/L)	sec-BB (µg/L)	EB (µg/L)	IPB (µg/L)	p-IPT (µg/L)	M Chlor (µg/L)	NAPHT (µg/L)	n-PB (µg/L)	Toluene (µg/L)	1,2,4-TCB (µg/L)	TCE (µg/L)	1,2,4-TMB (µg/L)	1,3,5-TMB (µg/L)	Xylenes (µg/L)
MW-8	3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/20/2004	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
	3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-9	3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/20/2004	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.72	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
	3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-10	3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/20/2004	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.72	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	<1.0
	3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-11	3/11/2004	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
	9/20/2004	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
	3/23/2005	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<1.0**
MW-12	3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/20/2004	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
	3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DW-1	3/11/2004	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
	9/20/2004	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
	3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
QA	9/20/2004	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
	3/23/2005	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<1.0**

Table 3

Groundwater Analytical Results - Volatile Organic Compounds

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

EXPLANATIONS:

n-BB = n-Butylbenzene
sec-BB = sec-Butylbenzene
EB = Ethylbenzene
IPB = Isopropylbenzene
p-IPT = p- Isopropyltoluene
M Chlor = Methylene chloride
NAPHT = Naphthalene
n-PB = n-Propylbenzene
1,2,4 TCB = 1,2,4 Trichlorobenzene
TCE = Trichloroethene
1,2,4-TMB = 1,2,4-Trimethylbenzene
1,3,5-TMB = 1,3,5-Trimethylbenzene

µg/L = Micrograms per Liter
-- = Not Analyzed
ND = Not Detected

ANALYTICAL METHODS:

EPA Method 8260B for Oxygenate Compounds

Table 4

Groundwater Analytical Results - CAM 17 Metals

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL ID	DATE	Arsenic (µg/L)	Barium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
MW-1	3/11/2004	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--
	3/23/2005	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
MW-2	3/11/2004	39	36	<20	<20	<20	<20	<5.0	<10	<20	<20
	9/20/2004	<5.0	140	<20	<20	<20	<20	<5.0	<10	<20	30
	3/23/2005	**46**	**42**	**<20**	**<20**	**<20**	**<20**	**<5.0**	**<10**	**<20**	**<20**
MW-3	3/11/2004	<5.0	110	<20	<20	<20	37	<5.0	<10	<20	<20
	9/20/2004	11	110	<20	<20	<20	25	<5.0	<10	<20	<20
	3/23/2005	**<5.0**	**50**	**<20**	**<20**	**<20**	**<20**	**<5.0**	**<10**	**<20**	**<20**
MW-4	3/11/2004	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--
	3/23/2005	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
MW-5	3/11/2004	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--
	3/23/2005	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
MW-6	3/11/2004	--	--	--	--	--	--	--	--	--	--
	9/21/2004	--	--	--	--	--	--	--	--	--	--
	3/23/2005	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
MW-7	3/11/2004	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--
	3/23/2005	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

Table 4

Groundwater Analytical Results - CAM 17 Metals

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL ID	DATE	Arsenic (µg/L)	Barium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
MW-8	3/11/2004	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--
	3/23/2005	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
MW-9	3/11/2004	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--
	3/23/2005	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
MW-10	3/11/2004	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--
	3/23/2005	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
MW-11	3/11/2004	18	42	<20	<20	<20	<20	<5.0	<10	<20	31
	9/20/2004	11	140	<20	<20	<20	35	<5.0	<10	<20	28
	3/23/2005	**16**	**48**	**<20**	**<20**	**<20**	**<20**	**<5.0**	**<10**	**<20**	**<20**
MW-12	3/11/2004	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--
	3/23/2005	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
DW-1	3/11/2004	--	--	--	--	--	--	--	--	--	--
	9/20/2004	--	--	--	--	--	--	--	--	--	--
	3/23/2005	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

Table 4

Groundwater Analytical Results - CAM 17 Metals

Former Unocal Bulk Plant No. 1975

1051 Spencer Avenue

Santa Rosa, California

EXPLANATIONS:

µg/L = Micrograms per Liter

-- = Not Analyzed

ND = Not Detected

ANALYTICAL METHODS:

EPA Methods 200.7, 200.8 and 245.1

Table 5

Groundwater Analytical Results - Fuel Oxygenate Compounds by EPA Method 8260

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL ID	DATE	TAME (ppb)	TBA (ppb)	DIPE (ppb)	EDB (ppb)	1,2-DCA (ppb)	Ethanol (ppb)	ETBE (ppb)	MTBE (ppb)	Methanol (ppb)
MW-2	03/28/00	NA	NA	NA	< 5.00	< 5.00	NA	NA	< 5.00	NA
	03/27/01	< 2.0	< 50	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	NA
	09/27/01	< 100	< 2,000	< 100	< 100	< 100	< 10,000	< 100	< 100	NA
	03/23/02	< 2.0	< 20	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	<100
	09/26/02	< 25	< 250	< 25	< 25	< 25	< 2,500	< 25	< 25	NA
	03/31/03	< 25	< 250	< 25	< 25	< 25	< 2,500	< 25	< 25	NA
	09/29/03	< 25	<500	< 25	<12	<12	< 2,500	< 25	<12	NA
	03/11/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	NA
	09/20/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	03/23/05	**NA**	**NA**	**NA**	**NA**	**NA**	**19**	**NA**	**NA**	**NA**
MW-3	03/28/00	NA	NA	NA	< 5.00	< 5.00	NA	NA	< 10.0	NA
	03/27/01	< 2.0	< 50	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	NA
	09/27/01	< 100	< 2,000	< 100	< 100	< 100	< 10,000	< 100	< 100	NA
	03/23/02	< 2.0	< 20	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	<100
	09/26/02	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 500	< 5.0	< 5.0	NA
	03/31/03	< 5.0	< 100	< 5.0	< 5.0	< 5.0	< 500	< 5.0	< 5.0	NA
	09/29/03	<10	<200	<10	< 5.0	<5	<1,000	<10	<5	NA
	03/11/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	NA
	09/20/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	03/23/05	**NA**	**NA**	**NA**	**NA**	**NA**	**18**	**NA**	**NA**	**NA**
MW-6	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	09/21/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	03/23/05	--	--	--	--	--	--	--	--	--
MW-7	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	09/29/03	<0.5	<5	<0.5	<0.5	<0.5	<100	<0.5	< 0.50	NA
	09/20/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	03/23/05	--	--	--	--	--	--	--	--	--

Table 5

Groundwater Analytical Results - Fuel Oxygenate Compounds by EPA Method 8260

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

MW-8	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	09/29/03	<0.5	<5	<0.5	<0.5	<0.5	<100	<0.5	< 0.50	NA
	09/20/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	03/23/05	--	--	--	--	--	--	--	--	--
MW-9	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	09/29/03	<0.5	<5	<0.5	<0.5	<0.5	<100	<0.5	< 0.50	NA
	09/20/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	03/23/05	--	--	--	--	--	--	--	--	--
MW-10	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	09/29/03	<0.5	<5	<0.5	<0.5	<0.5	<100	<0.5	< 0.50	NA
	09/20/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	03/23/05	--	--	--	--	--	--	--	--	--
MW-11	03/28/00	NA	NA	NA	< 5.00	< 5.00	NA	NA	< 1.00	NA
	03/27/01	< 2.0	< 50	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	NA
	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	03/23/02	< 2.0	< 20	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	<100
	09/26/02	< 0.50	< 5.0	< 0.50	< 0.50	< 0.50	< 50	< 0.50	< 0.50	NA
	03/31/03	< 1.0	< 20	< 1.0	< 1.0	< 1.0	< 100	< 1.0	< 1.0	NA
	09/29/03	<1	<20	<1	< 0.50	< 0.50	<100	<1	< 0.50	NA
	03/11/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	NA
	09/20/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	03/23/05	**NA**	**NA**	**NA**	**NA**	**NA**	**12**	**NA**	**NA**	**NA**
MW-12	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	09/29/03	<0.5	<5	<0.5	<0.5	<0.5	<100	<0.5	< 0.50	NA
	09/20/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	03/23/05	--	--	--	--	--	--	--	--	--
DW-1	03/11/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	NA
	09/20/04	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	03/23/05	--	--	--	--	--	--	--	--	--

Table 5

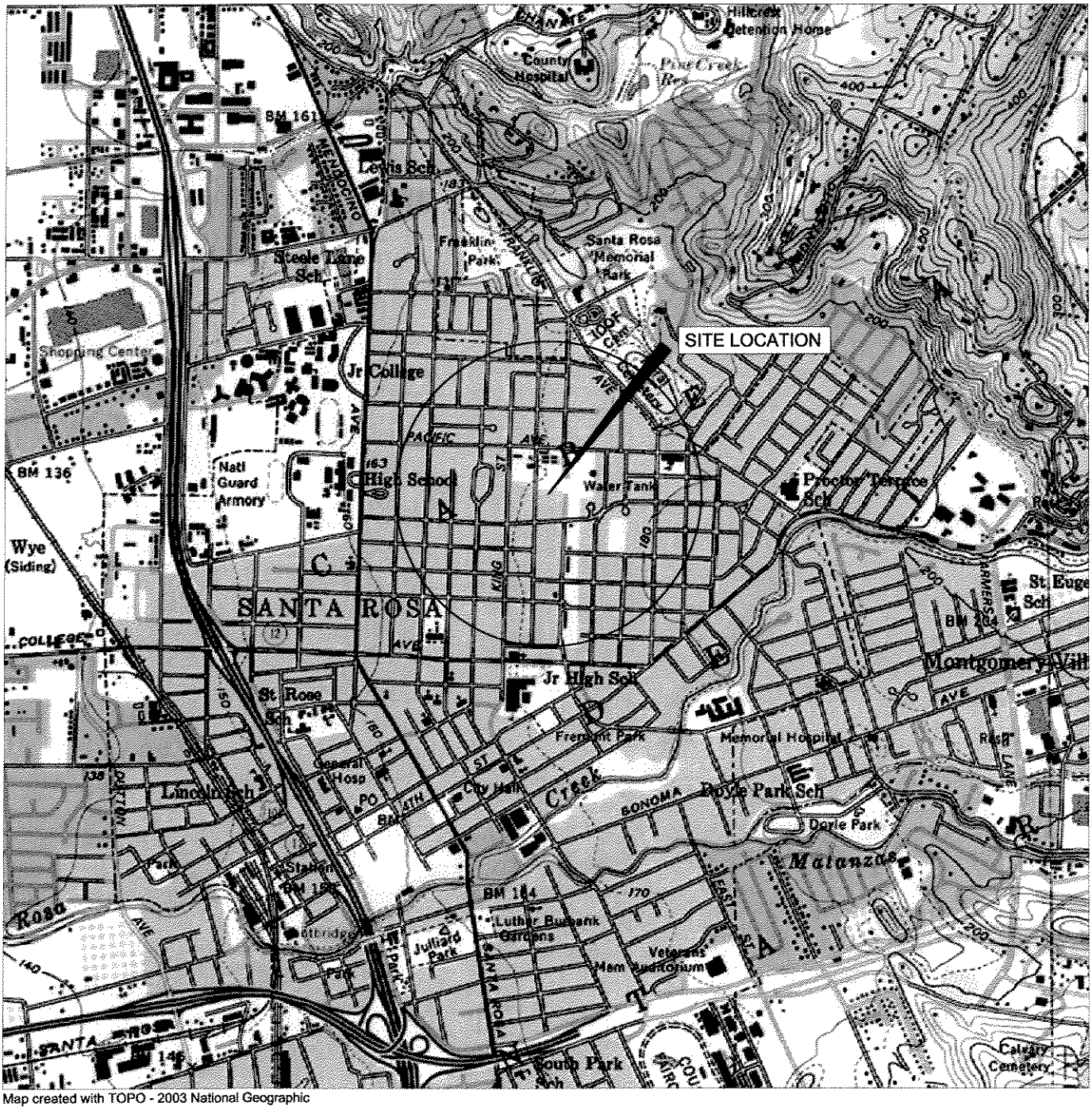
Groundwater Analytical Results - Fuel Oxygenate Compounds by EPA Method 8260

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

Explanations:

TAME = Tert-amyl methyl ether
TBA = Tert-butyl alcohol
DIPE = Di-isopropyl ether
EDB = 1,2-Dibromoethane
1,2-DCA = 1,2-Dichloroethane
ETBE = Ethyl tert-butyl ether
MTBE = Methyl tert-butyl ether
NA = Not analyzed
-- = Not Sampled

FIGURES



Map created with TOPO - 2003 National Geographic

MAP LOCATION

N

0 2000

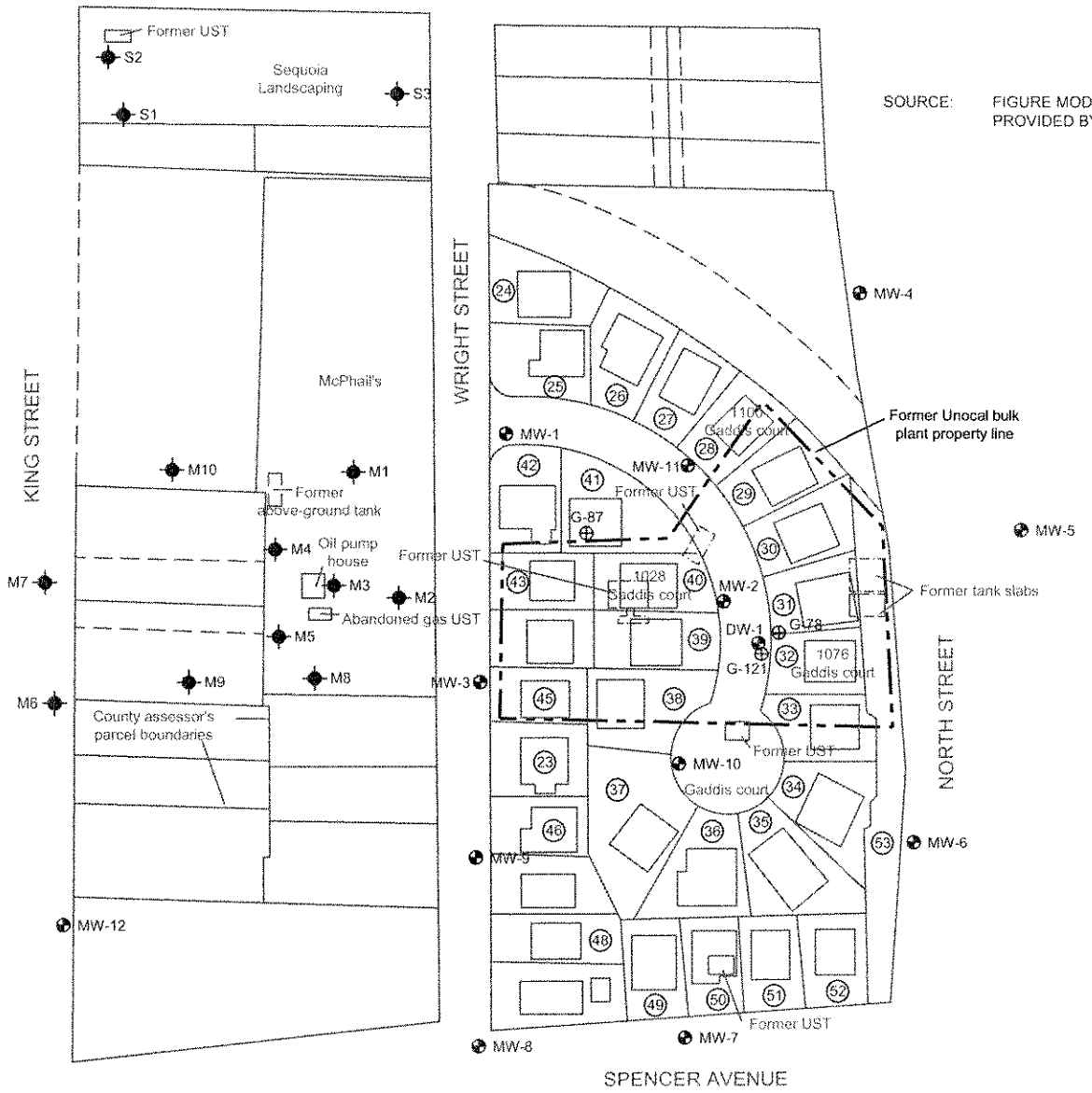
Approximate Scale in Feet

ENSR INTERNATIONAL
1420 Harbor Bay Parkway Ste 120
Alameda, CA 94502-7059
Phone: (510) 748-6700
Fax: (510) 748-6799
Web: WWW.ENSR.COM

SITE LOCATION MAP

FIGURE 1

Former UNOCAL Station 1975 1051 Spencer Avenue Santa Rosa, California	Corrective Action Plan	
DRAWN BY	DATE	PROJECT NUMBER
E COWAN	06/28/2005	06940-362-130



NOTE:
MW = SHALLOW MONITORING WELL (APPROXIMATE 20 FEET DEEP)
DW = DEEP MONITORING WELL (APPROXIMATE 40 FEET DEEP)

LEGEND
- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELLS (OFFSITE)
- FORMER GADDIS WELLS
- (49) SONOMA COUNTY, CA ASSESSOR'S PARCEL

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Alameda, California 94502
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Fax: (510) 748-6799
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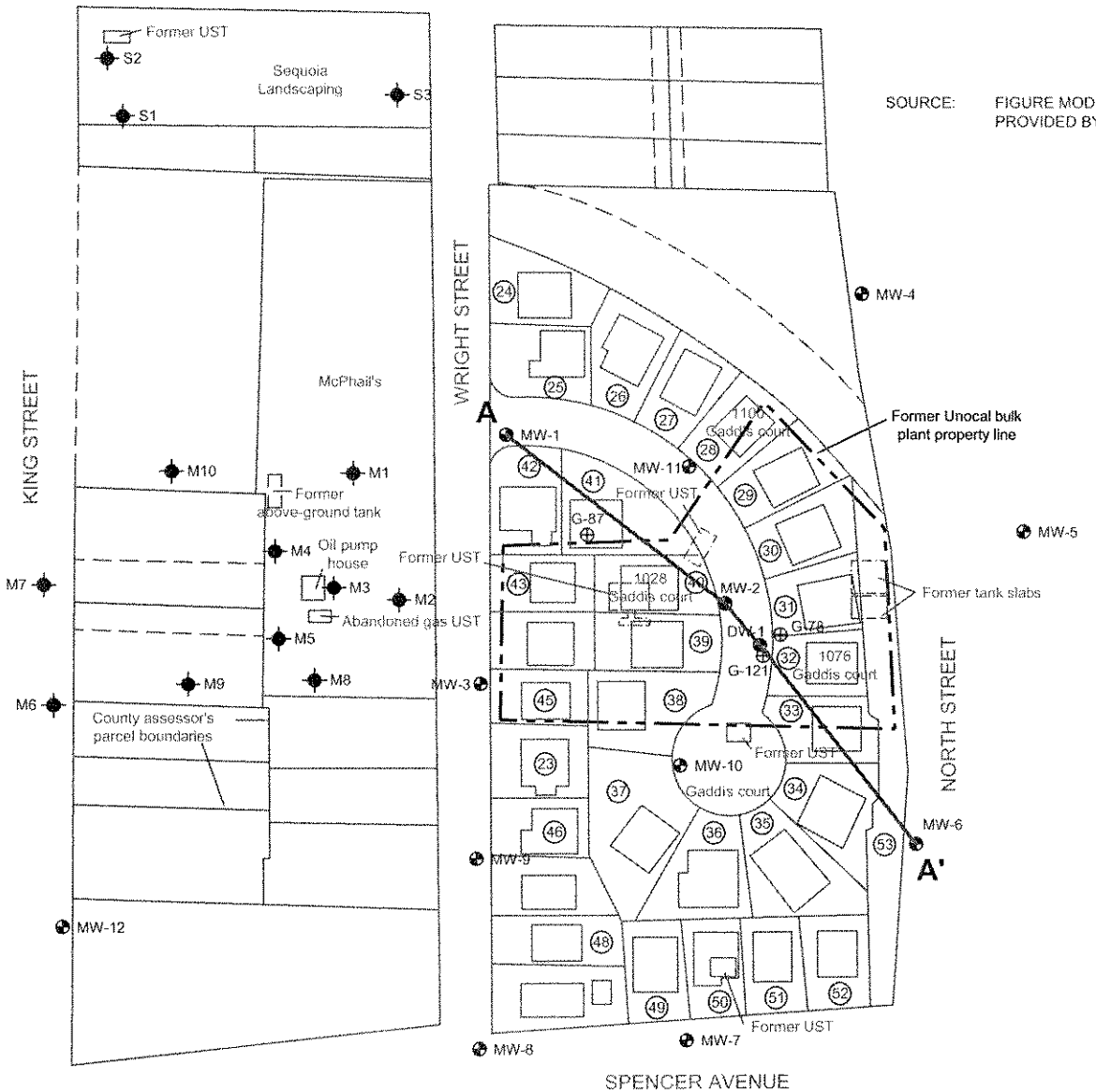
SITE MAP

FIGURE 2

Former UNOCAL Station 1975
1051 Spencer Avenue
Santa Rosa, California

Corrective Action Plan

DRAWN BY	DATE	PROJECT NUMBER
J.E.B.	7/21/04	06940-362-130



NOTE:
MW = SHALLOW MONITORING WELL (APPROXIMATE 20 FEET DEEP)
DW = DEEP MONITORING WELL (APPROXIMATE 40 FEET DEEP)

LEGEND

- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELLS (OFFSITE)
- FORMER GADDIS WELLS
- (49) SONOMA COUNTY, CA ASSESSOR'S PARCEL
- A —— A' CROSS-SECTION LOCATION

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1420 Harbor Bay Parkway Ste 120
Alameda, California 94502
Phone: (510) 748-6700
Fax: (510) 748-6799
Web: WWW.ENSR.COM

CROSS-SECTION LOCATION

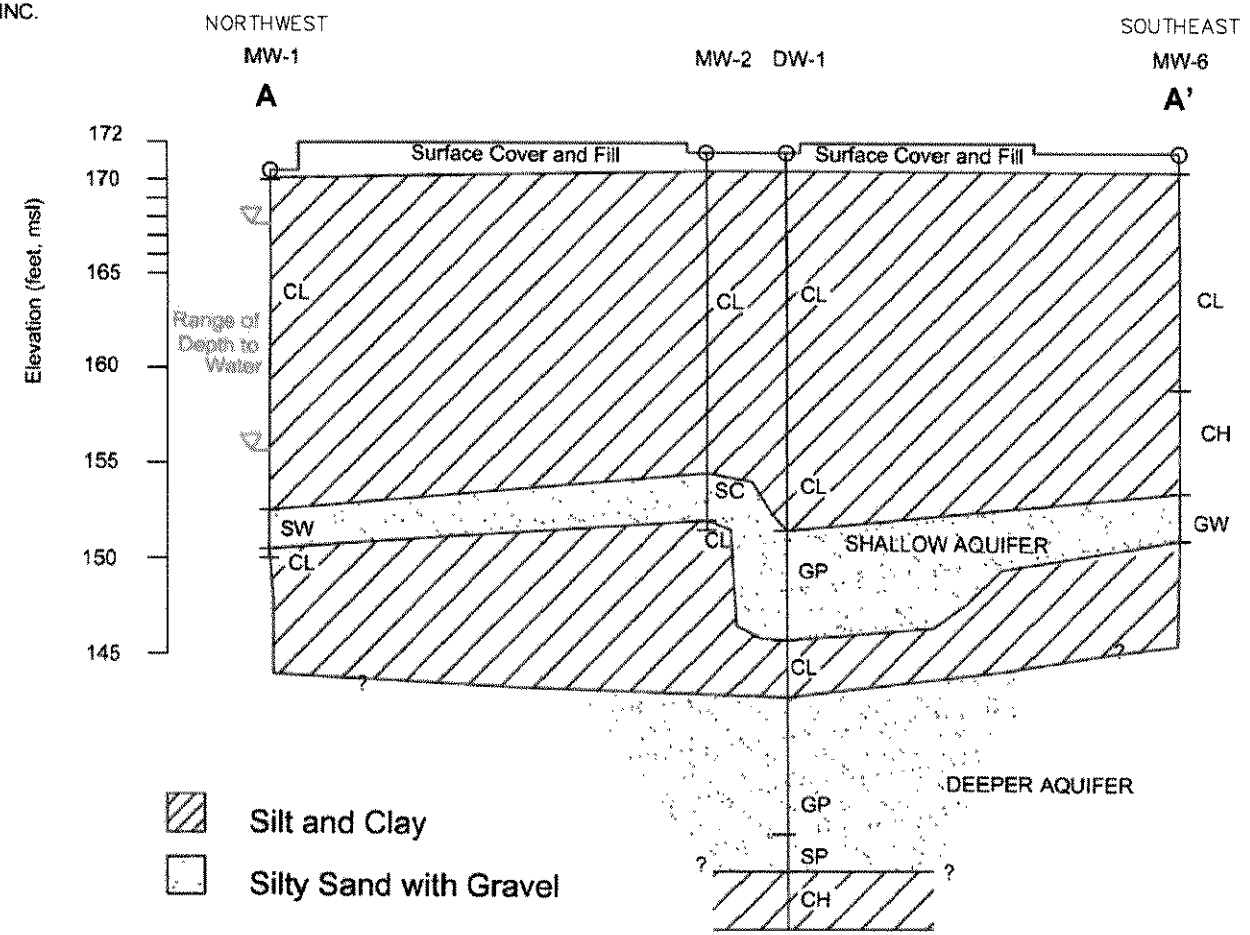
Former UNOCAL Station 1975
1051 Spencer Avenue
Santa Rosa, California

Corrective Action Plan

DRAWN BY	DATE	PROJECT NUMBER
J.E.B.	6/28/2005 PR	06940-362-130

FIGURE 3

SOURCE: FIGURE MODIFIED FROM EXISTING DRAWING PROVIDED BY CLAYTON GROUP SERVICES, INC.



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1420 Harbor Bay Parkway Suite 120
Alameda, California 94502-7059
Phone: (510) 748-6700
Fax: (510)748-6799
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GEOLOGIC CROSS-SECTION

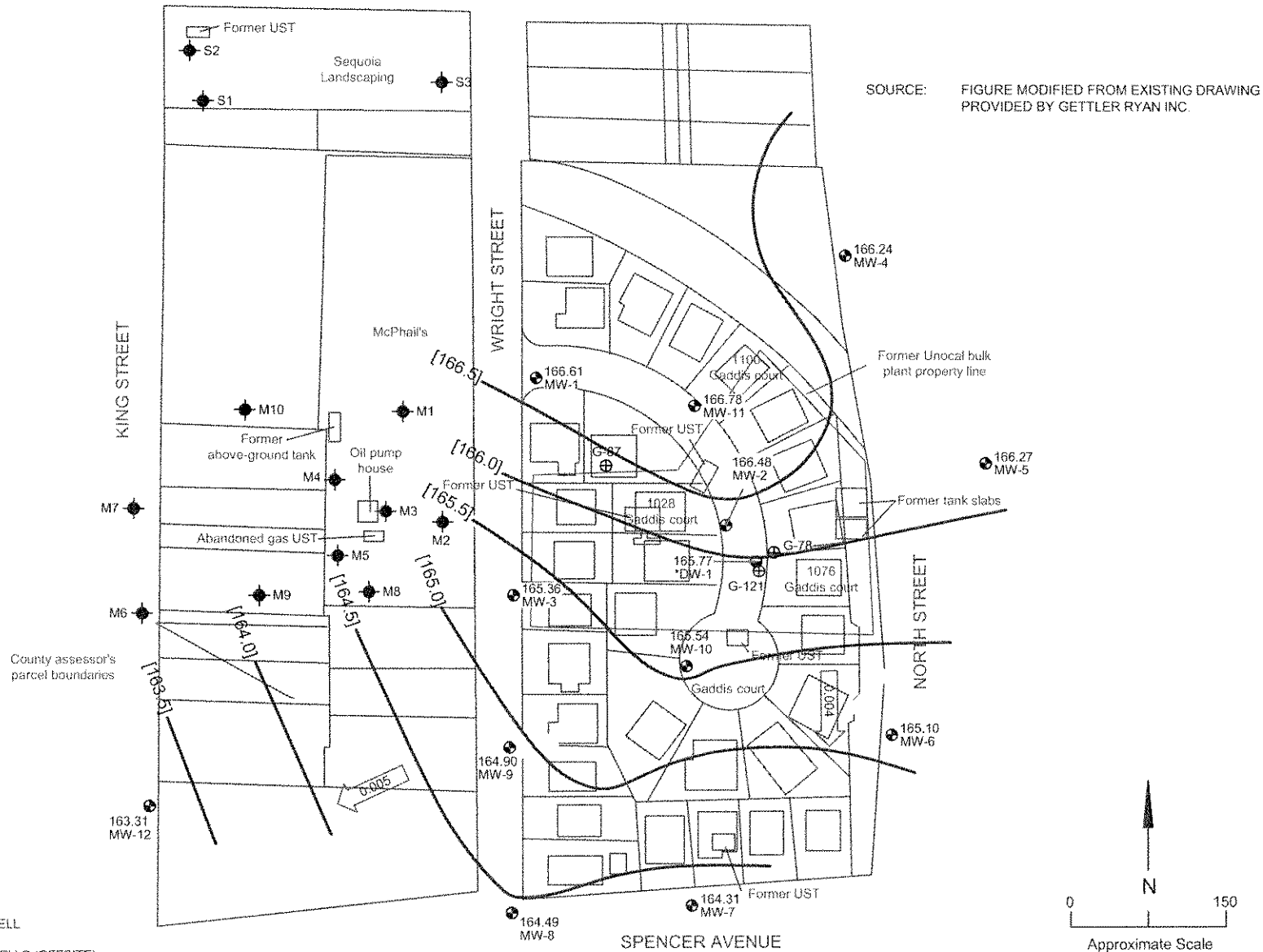
Former UNOCAL Station 1975
1051 Spencer Avenue
Santa Rosa, California

Corrective Action Plan

DRAWN BY	DATE	PROJECT NUMBER
J.E.B.	7/21/04	06940-362-130

FIGURE 4

FILENAME: 06940-362-07A.DWG



LEGEND

- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELLS (OFFSITE)
- FORMER GADDIS WELLS
- 152.34 GROUNDWATER ELEVATION IN FEET MEAN SEA LEVEL
- [153.50] GROUNDWATER ELEVATION CONTOUR
- 0.006 APPROXIMATE GROUNDWATER FLOW DIRECTION AND GRADIENT IN Ft/Ft
- DEEP MONITORING WELL (* NOT USED IN CONTOURING)

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1420 Harbor Bay Parkway
Alameda, California 94502
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Fax: (510) 748-6799
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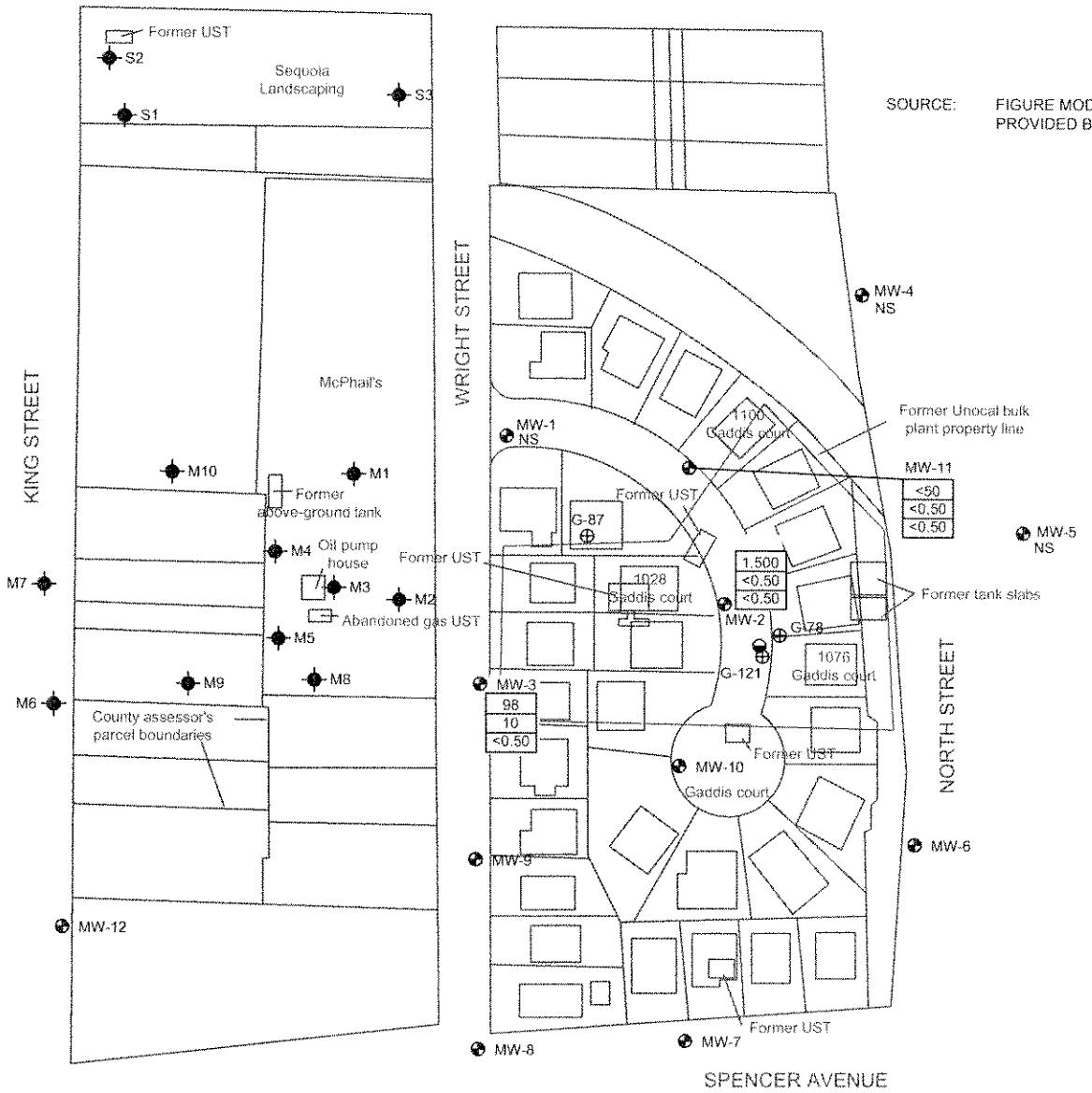
GROUNDWATER ELEVATION CONTOUR MAP (March 2005)

FIGURE 5

Former UNOCAL Station 1975
1051 Spencer Avenue
Santa Rosa, California

Corrective Action Plan

DRAWN BY	DATE	PROJECT NUMBER
D PARTIDA	4/11/2005	06940-362-130



SOURCE: FIGURE MODIFIED FROM EXISTING DRAWING PROVIDED BY GETTLER RYAN INC.

LEGEND

- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELLS (OFFSITE)
- FORMER GADDIS WELLS
- <50 TPHg CONCENTRATION IN ug/L
- <0.50 BENZENE IN ug/L
- <0.50 MtBE IN ug/L
- DEEP MONITORING WELL
- NA NOT ANALYZED
- NS NOT SAMPLED

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Alameda, California 94502
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CONCENTRATION MAP (March 2005)

Former UNOCAL Station 1975
1051 Spencer Avenue
Santa Rosa, California

Corrective Action Plan

DRAWN BY	DATE	PROJECT NUMBER
D PARTIDA	4/11/2005	06940-362-130

FIGURE 6

APPENDIX A

Groundwater Water Quality Objectives for Gaddis Nursery Site 2004

Groundwater Water Quality Objectives for Gaddis Nursery Site*
2004

Constituent of Concern	Practical Quantitation Limit µg/L	Water Quality Objective[1] µg/L
Gasoline	50	5.0[2]
Diesel	50	100[3]
Motor oil	175	None available
Benzene	0.50	0.15[4]
Toluene	0.50	40[5]
Ethylbenzene	0.50	30[5]
Xylenes	0.50	20[5]
Methyl tert-butyl ether	0.50	5[6]
2-Methylnaphthalene	1.0	28[7]
Naphthalene	0.50	21[11]
Lead	3.0	2.0[4]
Bis (2-ethylhexyl)phthalate	10	4.0[8]
Aldrin	0.050	0.002[9]
DDT	0.05	0.10[10]
DDE	0.05	0.10[10]
DDD	0.05	0.15[10]
Chlordane	1.0	0.03[4]
Benzo(a)anthracene	0.050	0.04[10]
Benzo(b)fluoranthene	0.050	0.04[10]
Benzo(k)fluoranthene	0.050	0.04[10]
Benzo(g,h,i)perylene	0.10	None available
Benzo(a)pyrene	0.050	0.004[4]
Chrysene	0.050	0.4[10]
Fluoranthene	0.050	280[7]
Ideno(1,2,3-cd)pyrene	0.050	0.04[10]
Phenanthrene	0.050	None available
Pyrene	0.050	210[7]
Phenol	10	2100[7]

[1]Practical quantitation limits are based on current technology. For instances where technology cannot achieve the water quality objective the practical quantitation limit will be used.
[2]Published literature provides a taste and odor threshold of 5 µg/L which is applied to the narrative TASTE AND ODOR water quality objective of the Basin Plan.
[3]Published literature provides a taste and odor threshold of 100 µg/L which is applied to the narrative TASTE AND ODOR water quality objective of the Basin Plan.
[4]California Public Health Goal (PHG) in Drinking Water (Office of Environmental Health Hazard Assessment) applied to TOXICITY water quality objective in the Basin Plan.
[5]US EPA Secondary Maximum Contaminant Level, applied to TASTE AND ODOR water quality objective in the Basin Plan.
[6]California Department of Health Services Secondary Maximum Contaminant Level, applied to TASTE AND ODOR water quality objective in the Basin Plan.
[7]USEPA IRIS Reference Dose applied to TOXICITY water quality objective in the Basin Plan
[8]CDHS Primary MCL applied to CHEMICAL CONSTITUENT water quality objective in the Basin Plan
[9]DHS Cal State Action Level applied to TOXICITY water quality objective in the Basin Plan
[10]Cal/EPA Cancer Potency Factor applied to TOXICITY water quality objective in the Basin Plan
[11]Published literature provides a taste and odor threshold of 21 ug/L which is applied to the narrative TASTE AND ODOR water quality objective in the Basin Plan

*This is not a complete list, additional constituents may be added.

APPENDIX B

Historical Well Monitoring Data and Historical Summary of Groundwater Analytical Results

Historical Well Monitoring Data
Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL NUMBER	DATE	TOP OF CASING ELEVATION *(Feet, MSL)*	DEPTH TO WATER *(Feet, MSL)*	PRODUCT THICKNESS *(Feet, MSL)*	GROUNDWATER ELEVATION *(Feet, MSL)*
MW1	12/23/91	169.64 (a)	14.40	--	155.24
	01/16/92		12.46	--	157.18
	02/20/92		5.97	--	163.67
	03/11/92		6.50	--	163.14
	04/17/92		6.54	--	163.10
	05/14/92		8.58	--	161.06
	06/18/92		10.49	--	159.15
	07/15/92		11.62	--	158.02
	08/06/92		12.64	--	157.00
	09/04/92		13.68	--	155.96
	10/28/92		14.40	--	155.24
	11/12/92		13.68	--	155.96
	12/02/92		14.22	--	155.42
	01/21/93		1.92	--	167.72
	02/25/93		1.84	--	167.80
	03/25/93		3.24	--	166.40
	04/15/93		0.93	--	168.71
	05/04/93		6.82	--	162.82
	06/15/93		9.05	--	160.59
	07/28/93		NA	NA	NA
	08/17/93		12.19	--	157.45
	09/16/93		13.36	--	156.28
	10/18/93		12.54	--	157.10
	10/19/93		12.62	--	157.02
	12/14/93		9.36	--	160.28
	01/07/94		10.98	--	158.66
	02/25/94		6.76	--	162.88
	03/14/94		8.19	--	161.45
	04/25/94		9.78	--	159.86
	05/17/94		10.58	--	159.06
	06/13/94		11.72	--	157.92
	07/06/94		12.58	--	157.06
	08/11/94		13.58	--	156.06
	09/29/94		14.76		154.88
	11/02/94		15.04	--	154.60
	11/29/94		11.43	--	158.21
	12/28/94		10.41	--	159.23
	01/23/95		1.10	--	168.54
	02/01/95		2.49	--	167.15
	03/02/95		4.24	--	165.40
	04/21/95		4.32	--	165.32
	05/17/95		5.40	--	164.24
	06/07/95		6.98	--	162.66
	07/31/95		9.94	--	159.70
	08/29/95		11.02	--	158.62
	09/26/95		12.40	--	157.24

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1051 Spencer Avenue
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MW1 (cont.)	10/31/95		13.82	--	155.82
	11/21/95		13.71	--	155.93
	12/21/95		10.60	--	159.04
	01/31/96		3.36	--	166.28
	03/27/96		4.74	--	164.90
	5/9/1996		7.10	Sheen	162.54
	8/19/1996		11.70	--	157.94
	12/12/1996		8.62	--	161.02
	3/4/1997		6.00	--	163.64
	6/27/1997		11.45	--	158.19
	9/29/1997		13.88	--	155.76
	12/17/1997		8.28	--	161.36
	3/16/1998		3.12	--	166.52
	6/29/1998		8.37	--	161.27
	9/17/1998		11.86	--	157.78
	3/17/1999		3.54	--	166.10
	9/20/1999		13.09	--	156.55
	3/28/2000		4.80	--	164.84
	10/12/2000		14.63	--	155.01
	3/27/2001		7.98	--	161.66
	9/27/2001		14.50	--	155.14
	3/23/2002		6.40	--	163.24
	9/26/2002		Well not measured		
	3/31/2003		6.69	--	162.95
	9/29/2003		12.41	--	157.23
MW2	12/23/91		15.85	--	155.23
	01/16/92		14.01	Sheen	157.07
	02/20/92		8.40	Sheen	162.68
	03/11/92		8.29	Sheen	162.79
	04/17/92		7.94	Sheen	163.14
	05/14/92		9.91	--	161.17
	06/18/92		11.97	Sheen	159.11
	07/15/92		NA	NA	NA
	08/06/92		14.13	Sheen	156.95
	09/04/92		14.84	Sheen	156.24
	10/28/92		15.73	Sheen	155.35
	11/12/92		15.25	Sheen	155.83
	12/02/92		15.66	Sheen	155.42
	01/21/93		3.26	--	167.82
	02/25/93		2.81	--	168.27
	03/25/93		4.60	--	166.48
	04/15/93		6.96	--	164.12
	05/04/93		7.85	--	163.23
	06/15/93		10.33	--	160.75
	07/28/93		12.86	--	158.22
	08/17/93		13.57	--	157.51
	09/16/93		14.96	Sheen	156.12
	10/18/93		13.92	Sheen	157.16
	10/19/93		14.05	--	157.03
	12/14/93		10.90	Sheen	160.18
	01/07/94		12.29	--	158.79
	02/25/94		8.57	Sheen	162.51
	03/14/94		9.56	--	161.52
	04/25/94		9.78	--	161.30
	05/17/94		12.03	Sheen	159.05
	06/13/94		13.17	Sheen	157.91
	07/06/94		NA	NA	NA
	08/11/94		NA	NA	NA
	09/29/94		15.98		155.10
	11/02/94		16.27	--	154.81

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MW2 (cont.)	11/29/94		12.89	Sheen	158.19
	12/28/94		11.74	--	159.34
	01/23/95		1.96	--	169.12
	02/01/95		NA	--	NA
	03/02/95		5.06	--	166.02
	04/21/95		5.32	--	165.76
	05/18/95		6.48	--	164.60
	06/07/95		7.62	--	163.46
	07/31/95		10.77	--	160.31
	08/29/95		11.85	--	159.23
	09/26/95		13.95	--	157.13
	10/31/95		15.50	--	155.58
	11/21/95		15.55	--	155.53
	12/21/95		12.67	--	158.41
	01/31/96		5.15	--	165.93
	03/27/96		5.73	--	165.35
	5/9/1996		7.64	--	163.44
	8/16/1996		12.84	--	158.24
	12/13/1996		10.51	--	160.57
	3/5/1997		6.62	Odor	164.46
	6/27/1997		12.62	Odor	158.46
	9/29/1997		14.92	Sheen & Odor	156.16
	12/17/1997		10.74	Odor	160.34
	3/16/1998		4.23	--	166.85
	6/29/1998		9.47	--	161.61
	9/17/1998		13.01	Odor	158.07
	3/17/1999		4.70	Odor	166.38
	9/20/1999		14.42	Sheen & Odor	156.66
	3/28/2000		5.81	Odor	165.27
	10/12/2000		14.77	Odor	156.31
	3/27/2001		9.17	Odor	161.91
	9/27/2001		15.85	Odor	155.23
	3/23/2002		7.58	--	163.50
	9/26/2002		15.57	--	155.51
	3/31/2003		7.80	Odor	163.28
	9/29/2003		12.98	--	158.10
MW3	12/23/91	170.21 (a)	15.75	--	154.46
	01/16/92		14.13	Sheen	156.08
	02/20/92		NA	NA	NA
	03/11/92		8.00	--	162.21
	04/17/92		7.94	Sheen	162.27
	05/14/92		9.94	--	160.27
	06/18/92		11.93	--	158.28
	07/15/92		13.16	--	157.05
	08/06/92		14.11	--	156.10
	09/04/92		15.11	--	155.10
	10/28/92		15.89	--	154.32
	11/12/92		15.12	--	155.09
	12/02/92		15.44	Sheen	154.77
	01/21/93		3.63	--	166.58
	02/25/93		2.04	--	168.17
	03/25/93		4.80	--	165.41
	04/15/93		7.11	--	163.10
	05/04/93		8.24	--	161.97
	06/15/93		10.43	--	159.78
	07/28/93		12.83	--	157.38
	08/17/93		13.68	--	156.53
	09/16/93		14.79	--	155.42
	10/18/93		14.31	--	155.90
	10/19/93		14.31	--	155.90

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MW3 (cont.)	12/14/93		11.48	--	158.73
	01/07/94		12.42	--	157.79
	02/25/94		8.53	--	161.68
	03/14/94		9.67	--	160.54
	04/25/94		11.11	--	159.10
	05/17/94		12.05	--	158.16
	06/13/94		13.21	--	157.00
	07/06/94		14.08	--	156.13
	08/11/94		15.05	--	155.16
	09/29/94		16.04	--	154.17
	11/02/94		16.25	--	153.96
	11/29/94		13.08	--	157.13
	12/28/94		11.82	--	158.39
	01/23/95		2.24	--	167.97
	02/01/95		2.57	--	167.64
	03/03/95		5.10	--	165.11
	04/21/95		5.36	--	164.85
	05/18/95		6.66	--	163.55
	06/07/95		8.41	--	161.80
	07/31/95		11.48	--	158.73
	08/29/95		12.82	--	157.39
	09/26/95		14.06	--	156.15
	10/31/95		15.56	--	154.65
	11/21/95		15.45	--	154.76
	12/21/95		11.71	--	158.50
	01/31/96		5.02	--	165.19
	03/27/96		5.72	--	164.49
	5/9/1996		8.21	--	162.00
	8/16/1996		13.08	--	157.13
	12/12/1996		10.95	--	159.26
	3/5/1997		6.84	--	163.37
	6/27/1997		12.83	Sheen & Odor	157.38
	9/29/1997		15.21	Odor	155.00
	12/17/1997		10.02	Odor	160.19
	3/16/1998		4.37	--	165.84
	6/29/1998		9.57	Odor	160.64
	9/17/1998		13.25	Odor	156.96
	3/17/1999		4.83	--	165.38
	9/20/1999		13.49	--	156.72
	3/28/2000		5.81	--	164.40
	10/12/2000		14.98	Odor	155.23
	3/27/2001		9.28	Odor	160.93
	9/27/2001		15.83	Odor	154.38
	3/23/2002		7.51	--	162.70
	9/26/2002		15.55	--	154.66
	3/31/2003		7.92	--	162.29
	9/29/2003		14.41	--	155.80
MW4	07/06/94	169.99 (b)	13.51	--	156.48
	08/11/94		14.55	--	155.44
	09/29/94		15.64		154.35
	11/02/94		15.97	--	154.02
	11/29/94		12.40	--	157.59
	12/28/94		19.66	--	150.33
	01/23/95		1.52	--	168.47
	02/01/95		1.81	--	168.18
	03/03/95		4.69	--	165.30
	04/21/95		4.82	--	165.17
	05/18/95		6.10	--	163.89
	06/07/95		7.61	--	162.38
	07/31/95		10.82	--	159.17

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MW4 (cont.)	08/29/95		12.08	--	157.91
	09/26/95		13.42	--	156.57
	10/31/95		14.87	--	155.12
	11/20/95		15.00	--	154.99
	12/21/95		11.04	--	158.95
	01/31/96		4.53	--	165.46
	03/27/96		5.08	--	164.91
	5/9/1996		7.54	--	162.45
	8/19/1996		12.48	--	157.51
	12/12/1996		9.90	--	160.09
	3/4/1997		6.41	--	163.58
	6/27/1997		12.61	--	157.38
	9/29/1997		14.75	--	155.24
	12/17/1997		9.14	--	160.85
	3/16/1998		3.57	--	166.42
	6/29/1998		8.90	--	161.09
	9/17/1998		12.65	--	157.34
	3/17/1999		4.07	--	165.92
	9/20/1999		13.96	--	156.03
	3/28/2000		5.24	--	164.75
	10/12/2000		14.52	--	155.47
	3/27/2001		8.50	--	161.49
	9/27/2001		15.52	--	154.47
	3/23/2002		7.03	--	162.96
	9/26/2002		Well not measured		
	3/31/2003		7.26	--	162.73
	9/29/2003		13.63		156.36
MW5	07/06/94	170.17 (b)	13.67	--	156.50
	08/11/94		14.70	--	155.47
	09/29/94		15.25	--	154.92
	11/02/94		15.67	--	154.50
	11/29/94		12.45	--	157.72
	12/28/94		11.21	--	158.96
	01/23/95		0.97	--	169.20
	02/01/95		1.45	--	168.72
	03/03/95		4.48	--	165.69
	04/21/95		4.60	--	165.57
	05/18/95		5.90	--	164.27
	06/07/95		7.52	--	162.65
	07/31/95		10.77	--	159.40
	08/29/95		NA	NA	NA
	09/26/95		13.47	--	156.70
	10/31/95		15.22	--	154.95
	11/20/95		15.28	--	154.89
	12/21/95		11.09	--	159.08
	01/31/96		4.57	--	165.60
	03/27/96		5.79	--	164.38
	5/10/1996		7.38	--	162.79
	8/10/1996		12.46	--	157.71
	12/12/1996		10.35	--	159.82
	3/4/1997		7.86	--	162.31
	6/27/1997		12.34	--	157.83
	9/29/1997		14.62	--	155.55
	12/17/1997		9.31	--	160.86
	3/16/1998		3.40	--	166.77
	6/29/1998		8.76	--	161.41
	9/17/1998		12.68	--	157.49
	3/17/1999		3.88	--	166.29
	9/20/1999		14.03	--	156.14
	3/28/2000		4.96	--	165.21

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MW5 (cont.)	10/12/2000		14.46	--	155.71
	3/27/2001		8.36	--	161.81
	9/27/2001		15.56	--	154.61
	3/23/2002		6.88	--	163.29
	9/26/2002		Well not measured		
	3/31/2003		7.15	--	163.02
	9/29/2003		NA		
MW6	7/06/94	171.35 (b)	13.67	--	157.68
	08/11/94		16.44	--	154.91
	09/29/94		17.25	--	154.10
	11/02/94		17.43	--	153.92
	11/29/94		14.26	--	157.09
	12/28/94		13.40	--	157.95
	01/23/95		3.45	--	167.90
	02/01/95		3.82	--	167.53
	03/03/95		6.06	--	165.29
	04/21/95		6.30	--	165.05
	05/18/95		7.70	--	163.65
	06/07/95		9.39	--	161.96
	07/31/95		12.61	--	158.74
	08/29/95		13.90	--	157.45
	09/26/95		15.31	--	156.04
	10/31/95		16.83	--	154.52
	11/20/95		16.85	--	154.50
	12/21/95		12.91	--	158.44
	01/31/96		6.99	--	164.36
	03/27/96		6.55	--	164.80
	5/10/1996		9.22	--	162.13
	8/19/1996		14.20	--	157.15
	12/12/1996		12.30	--	159.05
	3/4/1997		5.79	--	165.56
	6/27/1997		13.46	--	157.89
	9/29/1997		16.46	--	154.89
	12/17/1997		11.24	--	160.11
	3/16/1998		5.81	--	165.54
	6/29/1998		10.61	--	160.74
	9/17/1998		14.44	--	156.91
	3/17/1999		5.97	--	165.38
	9/20/1999		15.81	--	155.54
	3/28/2000		6.76	--	164.59
	10/12/2000		16.21	--	155.14
	3/27/2001		10.28	--	161.07
	9/27/2001		17.20	--	154.15
	3/23/2002		8.10	--	163.25
	9/26/2002		16.92	--	154.43
	3/31/2003		9.10	--	162.25
	9/29/2003		NA		
MW7	07/06/94	171.16 (b)	15.58	--	155.58
	08/11/94		16.60	--	154.56
	09/29/94		17.45	--	153.71
	11/02/94		17.61	--	153.55
	11/29/94		14.70	--	156.46
	12/28/94		13.40	--	157.76
	01/23/95		4.93	--	166.23
	02/01/95		3.96	--	167.20
	03/03/95		6.71	--	164.45
	04/21/95		6.66	--	164.50
	05/17/95		7.98	--	163.18
	06/07/95		9.90	--	161.26

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MW7 (cont.)	07/31/95		13.09	--	158.07
	08/29/95		14.37	--	156.79
	09/26/95		15.49	--	155.67
	10/31/95		16.88	--	154.28
	11/20/95		16.83	--	154.33
	12/21/95		13.22	--	157.94
	01/31/96		7.66	--	163.50
	03/27/96		6.98	--	164.18
	5/10/1996		9.62	--	161.54
	8/19/1996		14.40	--	156.76
	12/12/1996		12.96	--	158.20
	3/4/1997		8.31	--	162.85
	6/27/1997		13.94	--	157.22
	9/29/1997		16.58	--	154.58
	12/17/1997		11.56	--	159.60
	3/16/1998		5.92	--	165.24
	6/29/1998		10.99	--	160.17
	9/17/1998		14.60	--	156.56
	3/17/1999		6.32	--	164.84
	9/20/1999		16.00	--	155.16
	3/28/2000		7.10	--	164.06
	10/12/2000		16.35	--	154.81
	3/27/2001		10.70	--	160.46
	9/27/2001		17.30	--	153.86
	3/23/2002		9.15	--	162.01
	9/26/2002		17.12	--	154.04
	3/31/2003		9.55	--	161.61
	9/29/2003		16.03		155.13
MW8	07/06/94	170.75 (b)	14.86	--	155.89
	08/11/94		15.84	--	154.91
	09/29/94		16.68	--	154.07
	11/02/94		16.88	--	153.87
	11/29/94		14.02	--	156.73
	12/28/94		12.72	--	158.03
	01/23/95		3.57	--	167.18
	02/01/95		3.62	--	167.13
	03/03/95		6.14	--	164.61
	04/21/95		6.12	--	164.63
	05/17/95		7.43	--	163.32
	06/07/95		9.30	--	161.45
	07/31/95		12.42	--	158.33
	08/29/95		13.70	--	157.05
	09/26/95		14.77	--	155.98
	10/31/95		16.25	--	154.50
	11/21/95		16.02	--	154.73
	12/21/1995		12.54	--	158.21
	01/31/96		7.02	--	163.73
	03/27/96		6.35	--	164.40
	5/10/1996		9.08	--	161.67
	8/19/1996		13.76	--	156.99
	12/12/1996		12.29	--	158.46
	3/4/1997		7.76	--	162.99
	6/27/1997		13.42	--	157.33
	9/27/1997		15.82	--	154.93
	12/17/1997		10.96	--	159.79
	3/16/1998		5.29	--	165.46
	6/29/1998		10.36	--	160.39
	9/17/1998		13.88	--	156.87
	3/17/1999		5.72	--	165.03
	9/20/1999		15.82	--	154.93

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MW8 (cont.)	3/28/2000		6.54	--	164.21
	10/12/2000		15.61	--	155.14
	3/27/2001		10.11	--	160.64
	9/27/2001		16.49	--	154.26
	3/23/2002		8.54	--	162.21
	9/26/2002		16.34	--	154.41
	3/31/2003		8.98	--	161.77
	9/29/2003		15.41	--	155.34
MW9	07/06/94	170.46 (b)	14.45	--	156.01
	08/11/94		15.44	--	155.02
	09/29/94		16.25	--	154.21
	11/02/94		16.44	--	154.02
	11/29/94		13.53	--	156.93
	12/28/94		12.29	--	158.17
	01/23/95		2.72	--	167.74
	02/01/95		2.88	--	167.58
	03/03/95		5.60	--	164.86
	04/21/95		5.62	--	164.84
	05/17/95		6.91	--	163.55
	06/07/95		9.81	--	160.65
	07/31/95		11.93	--	158.53
	08/29/95		13.22	--	157.24
	09/26/95		14.39	--	156.07
	10/31/95		15.74	--	154.72
	11/21/95		15.74	--	154.72
	12/21/95		12.08	--	158.38
	01/31/96		6.31	--	164.15
	03/27/96		5.86	--	164.60
	5/10/1996		8.56	--	161.90
	8/19/1996		13.39	--	157.07
	12/12/1996		11.76	--	158.70
	3/4/1997		7.26	--	163.20
	6/27/1997		13.19	--	157.27
	9/29/1997		15.46	--	155.00
	12/17/1997		10.46	--	160.00
	3/16/1998		4.82	--	165.64
	6/29/1998		9.89	--	160.57
	9/17/1998		13.56	--	156.90
	3/17/1999		5.20	--	165.26
	9/20/1999		14.84	--	155.62
	3/28/2000		6.05	--	164.41
	10/12/2000		15.24	--	155.22
	3/27/2001		9.58	--	160.88
	9/27/2001		16.14	--	154.32
	3/23/2002		8.02	--	162.44
	9/26/2002		15.91	--	154.55
	3/31/2003		8.38	--	162.08
	9/29/2003		14.85	--	155.61
MW10	07/06/94	171.89 (b)	15.47	--	156.42
	08/11/94		16.51	--	155.38
	09/29/94		17.35		154.54
	11/02/94		17.56	--	154.33
	11/29/94		14.36	--	157.53
	12/28/94		13.10	--	158.79
	01/23/95		3.32	--	168.57
	02/01/95		3.54	--	168.35
	03/02/95		5.78	--	166.11
	04/21/95		6.52	--	165.37
	05/17/95		7.92	--	163.97

Historical Well Monitoring Data
Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL NUMBER	DATE	TOP OF CASING ELEVATION (Feet, MSL)	DEPTH TO WATER (Feet, MSL)	PRODUCT THICKNESS (Feet, MSL)	GROUNDWATER ELEVATION (Feet, MSL)
MW10 (cont.)	06/07/95		9.72	--	162.17
	07/31/95		12.75	--	159.14
	08/29/95		NA	NA	NA
	09/26/95		15.38	--	156.51
	10/31/95		17.89	--	154.00
	11/20/95		16.88	--	155.01
	12/21/95		17.99	--	153.90
	01/31/96		7.01	--	164.88
	03/27/96		6.88	--	165.01
	5/10/1996		9.31	--	162.58
	8/16/1996		14.28	--	157.61
	12/12/1996		12.30	--	159.59
	3/5/1997		8.18	--	163.71
	6/27/1997		14.11	--	157.78
	9/29/1997		16.50	--	155.39
	12/17/1997		NA	--	NA
	3/16/1998		5.66	--	166.23
	6/29/1998		10.81	--	161.08
	9/17/1998		14.54	--	157.35
	3/17/1999		6.09	--	165.80
	9/20/1999		15.86	--	156.03
	3/28/2000		NA	--	NA
	10/12/2000		16.28	--	155.61
	3/27/2001		10.58	--	161.31
	9/27/2001		17.32	--	154.57
	3/23/2002		8.96	--	162.93
	9/26/2002		16.99	--	154.90
	3/31/2003		9.26	--	162.63
	9/29/2003		15.81	--	156.08
MW11	07/06/94	170.43 (b)	13.36	Sheen	157.07
	08/11/94		14.34		156.09
	09/29/94		15.48		154.95
	11/01/94		15.77	--	154.66
	11/29/94		12.19	Sheen	158.24
	12/28/94		11.14	--	159.29
	01/23/95		1.55	--	168.88
	02/01/95		3.96	--	166.47
	03/02/95		4.90	--	165.53
	04/21/95		4.96	--	165.47
	05/17/95		6.00	Sheen	164.43
	06/07/95		7.48	--	162.95
	07/31/95		10.57	Sheen	159.86
	08/29/95		11.72	--	158.71
	09/26/95		13.28	Sheen	157.15
	10/31/95		14.78	--	155.65
	11/20/95		14.79	Sheen	155.64
	12/21/95		10.93	--	159.50
	01/31/96		4.30	--	166.13
	03/27/96		5.35	Sheen	165.08
	5/10/1996		7.66	Sheen	162.77
	8/16/1996		12.54	--	157.89
	12/12/1996		9.60	--	160.83
	3/5/1997		6.59	Sheen & Odor	163.84
	6/27/1997		12.41	Sheen & Odor	158.02
	9/29/1997		14.60	--	155.83
	12/17/1997		9.04	Sheen & Odor	161.39
	3/17/1998		3.91	--	166.52
	6/29/1998		9.00	Sheen	161.43
	9/17/1998		12.55	Sheen	157.88
	3/17/1999		4.14	Sheen & Odor	166.29

Historical Well Monitoring Data
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1051 Spencer Avenue
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WELL NUMBER	DATE	TOP OF CASING ELEVATION *(Feet, MSL)*	DEPTH TO WATER *(Feet, MSL)*	PRODUCT THICKNESS *(Feet, MSL)*	GROUNDWATER ELEVATION *(Feet, MSL)*
MW11 (cont.)	9/20/1999		13.85	Sheen	156.58
	3/28/2000		5.37	Sheen	165.06
	10/12/2000		13.36	Sheen	157.07
	3/27/2001		8.63	Sheen	161.80
	9/27/2001		15.32	--	155.11
	3/23/2002		7.04	--	163.39
	9/26/2002		15.07	--	155.36
	3/31/2003		7.22	Sheen	163.21
	9/29/2003		13.04	--	157.39
MW12	07/06/94	168.84 (b)	13.95	--	154.89
	08/11/94		NA	NA	NA
	09/29/94		15.78		153.06
	11/02/94		15.94	--	152.90
	11/29/94		13.09	--	155.75
	12/28/94		11.98	--	156.86
	01/23/95		2.65	--	166.19
	02/01/95		3.96	--	164.88
	03/03/95		5.12	--	163.72
	04/21/95		5.51	--	163.33
	05/17/95		6.96	--	161.88
	06/07/95		8.78	--	160.06
	07/31/95		11.73	--	157.11
	08/29/95		NA	NA	NA
	09/26/95		13.85	--	154.99
	10/31/95		14.83	--	154.01
	11/21/95		14.76	--	154.08
	12/21/95		NA	NA	NA
	01/31/96		5.99	--	162.85
	03/27/96		5.78	--	163.06
	5/10/1996		8.61	--	160.23
	8/19/1996		12.99	--	155.85
	12/12/1996		11.20	--	157.64
	3/4/1997		7.27	--	161.57
	6/27/1997		12.67	--	156.17
	9/29/1997		14.76	--	154.08
	12/17/1997		10.05	--	158.79
	3/16/1998		4.61	--	164.23
	6/29/1998		9.65	--	159.19
	9/17/1998		12.92	--	155.92
	3/17/1999		5.10	--	163.74
	9/20/1999		14.36	--	154.48
	3/28/2000		5.95	--	162.89
	10/12/2000		14.52	--	154.32
	3/27/2001		9.39	--	159.45
	9/27/2001		14.93	--	153.91
	3/23/2002		7.80	--	161.04
	9/26/2002		14.86	--	153.98
	3/31/2003		8.38	--	160.46
	9/29/2003		14.57	--	154.27

Historical Well Monitoring Data
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1051 Spencer Avenue
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WELL NUMBER	DATE	TOP OF CASING ELEVATION *(Feet, MSL)*	DEPTH TO WATER *(Feet, MSL)*	PRODUCT THICKNESS *(Feet, MSL)*	GROUNDWATER ELEVATION *(Feet, MSL)*
DW1	07/06/94	171.27 (b)	15.08	--	156.19
	08/11/94		16.18	--	155.09
	09/29/94		17.18		154.09
	11/1/94		17.35	--	153.92
	11/29/94		14.00	--	157.27
	12/28/94		12.60	--	158.67
	01/23/95		2.71	--	168.56
	02/01/95		3.00	--	168.27
	03/02/95		5.94	--	165.33
	04/21/95		6.00	--	165.27
	05/17/95		7.33	--	163.94
	06/07/95		9.02	--	162.25
	07/31/95		12.33	--	158.94
	08/29/95		13.71	--	157.56
	09/26/95		15.01	--	156.26
	10/31/95		16.16	--	155.11
	11/21/95		16.54	--	154.73
	12/21/95		12.51	--	158.76
	01/31/96		6.20	--	165.07
	03/27/96		6.18	--	165.09
	5/9/1996		8.72	--	162.55
	08/16/96		13.90	--	157.37
	12/12/96		12.95	--	158.32
	3/5/97		7.62	--	163.65
	6/27/1997		13.64	Light Sheen	157.63
	9/29/1997		14.60	--	156.67
	12/17/1997		10.67	Light Sheen	160.60
	3/16/1998		4.85	--	166.42
	6/29/1998		10.57	--	160.70
	9/17/1998		14.10	--	157.17
	3/17/1999		5.34	--	165.93
	9/20/1999		15.42	--	155.85
	3/28/2000		6.36	--	164.91
	9/27/2001		17.07	--	154.20
	3/23/2002		8.24	--	163.03
	9/26/2002		Well not measured		
	3/31/2003		8.51	--	162.76
	9/29/2003		15.38	--	155.89

NOTES:
-- = No free product or sheen present
NA = Well not available due to blocked access
MSL = Mean Sea Level
(a) = Well Installed and Surveyed in 1991
(b) = Well Installed and Surveyed in 1994

Historical Summary of Groundwater Analytical Results for TPH, BTEX, MTBE, Lead, and Nitrate

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL NUMBER	DATE	TPHd (ppb)	TPHg (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	MTBE (10) (ppb)	TOTAL LEAD (ppm)		NITRATE (ppm)
MW1	06/04/91	ND	ND	ND	ND	ND	ND		0.047	(1)	4.3
	09/11/91	ND	ND	ND	ND	ND	ND		0.030	(1)	--
	10/18/91	---	ND	ND	ND	ND	ND		0.031	(1)	5.8
	11/14/91	ND	ND	ND	ND	ND	ND		0.021	(1)	--
	03/11/92	ND	ND	ND	ND	ND	ND		0.026	(1)	--
	06/18/92	ND	ND	ND	ND	ND	ND		ND	(1)	22
	09/04/92	ND	ND	ND	ND	ND	ND		0.05	(1)	--
	11/12/92*	ND	ND	ND	ND	ND	ND		ND	(1)	15
	03/25/93	ND	ND	ND	ND	ND	ND		0.006	(1)	--
	06/15/93	ND	ND	ND	ND	ND	ND		0.022	(1)	4.2
	08/17/93	ND	ND	ND	ND	ND	ND		ND	(1)	5.8
	12/14/93	ND	ND**	ND**	ND**	ND**	ND**		ND		--
	03/14/94	ND	ND	ND	ND	ND	ND		ND	(1)	12
	05/17/94	ND	ND	ND	ND	ND	ND		ND		12
	07/07/94	ND	ND	ND	ND	ND	ND		ND		12
	11/30/94	ND	ND	ND	ND	ND	ND		ND		--
	03/02/95	ND	ND	ND	ND	ND	ND		ND		--
	05/17/95	ND	ND	ND	ND	ND	ND		ND		--
	09/28/95	ND	ND	ND	ND	ND	ND		ND		--
	11/21/95	ND	ND	ND	ND	ND	ND		--		--
	03/28/96	ND	ND	ND	ND	ND	ND		--		--
	5/9/1996	ND	ND	ND	ND	ND	ND		--		--
	8/19/1996	ND	ND	ND	ND	ND	ND		--		--
	12/13/1996	ND	ND	ND	ND	ND	ND		--		--
	3/5/1997	ND	ND	ND	ND	ND	ND		--		--
	6/27/1997	ND	ND	ND	ND	ND	ND		--		--
	9/29/1997	ND	ND	ND	ND	ND	ND		--		--
	12/17/1997	ND	ND	ND	ND	ND	ND		--		--
	3/17/1998	ND	ND	ND	ND	ND	ND		--		--
	6/29/1998	ND	ND	ND	ND	ND	ND		--		--
	9/19/1998	ND	ND	ND	ND	ND	ND		--		--
MW2	06/04/91	5,600	40,000	380	380	1,600	7,100		0.026	(1)	ND
	09/11/91	NS	NS	NS	NS	NS	NS		NS	(1)	--
	10/18/91	NS	NS	NS	NS	NS	NS		NS	(1)	ND
	11/14/91	NS	NS	NS	NS	NS	NS		NS	(1)	--
	03/11/92	NS	NS	NS	NS	NS	NS		NS	(1)	--
	06/18/92	NS	48,000	300	350	1,500	8,400		ND	(1)	ND
	09/04/92	NS	57,000	1,000	830	5,100	16,000		0.09	(1)	--
	11/12/92*	NS	51,000	500	520	4,400	13,000		ND	(1)	ND
	03/25/93	6,000	14,000	41	51	1,000	2,000		0.0088	(1)	--
	06/15/93	17,000	4,700	50	ND	330	400		0.012	(1)	ND
	08/17/93	1,800	48,000	120	180	3,900	9,200		ND	(1)	ND
	12/14/93	10,000	9,400	ND	ND	520	710		ND		--

Historical Summary of Groundwater Analytical Results for TPH, BTEX, MTBE, Lead, and Nitrate

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WELL NUMBER	DATE	TPHd (ppb)	TPHg (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	MTBE (10) (ppb)	TOTAL LEAD (ppm)	NITRATE (ppm)
	03/14/94	1,500	5,000	47	10	320	260		ND (1)	ND
	05/17/94	3,100	22,000	48	48	2,200	2,600		ND	ND
	07/07/94	UA	UA	UA	UA	UA	UA		UA	UA
	11/30/94	3,500 (2)	34,000	95	110	3,000	5,200		ND	--
	03/03/95	1,500	5400	9.0	ND	490	370		ND	- -
	05/18/95	1,900	10,000	17	ND	760	580		ND	--
	09/28/95	6,900	32,000	84	40	2,700	3,400***		ND	--
	11/21/95	6,000	42,000	84	40	2,700	3,4000***		ND	--
	03/28/96	880	1,900	17	ND	130	39		ND	--
	5/9/1996	630	900	11	ND	35	9		ND	--
	8/16/1996	3,500 (4)	20,000	31	22	2,100	1600		ND	--
	12/12/1996	1,700	7,200	ND	ND	520	320		ND	--
	3/5/1997	770 (6)	3,100	44	ND	260	72		ND	--
	6/27/1997	4,500	14,000	69	ND	1,400	590		ND	--
	9/30/1997	6,000	31,000	200	27	3,200	2,700		ND	--
	12/18/1997	2,400 (6)	4,500	21	ND	310	110		ND	--
	3/17/1998	640 (6)	1,400	12	ND	180	34		ND	--
	6/30/1998	410 (6)	690	ND	ND	26	5.0		ND	--
	9/18/1998	5,000 (6)	12,000	37	ND	2,300	980		ND	--
	3/17/1999	1,200 (6)	4,600	55	ND	590	130	130	ND	--
	9/20/1999	4,700 (6), (9)	23,000	ND	ND	2,300	890	ND	ND	--
	3/28/2000	593 (6), (9)	1,650	1.01	ND	110	10.6	10 (11)	ND	--
	10/12/2000	3,800 (12)	14,000	81	ND	2,100	370	290	ND	ND
	3/27/2001	620 (6)	2,500	32	ND	210	9	81 (11)	ND	--
	9/27/2001	2,500 (13)	25,000	31	13	3,100	1,100	--	ND	--
	3/23/2002	560 (13)	1,900	19	4.8	63	5.6	--	ND	--
	9/26/2002	300 (13)	10,000	130	19	2,000	570	--	--	--
	3/31/2003	860 (13)	2,200	ND	ND	60	6.7	--	--	--
	9/29/2003	2,500	4,800	ND	ND	320	21.0	ND	ND	--

Historical Summary of Groundwater Analytical Results for TPH, BTEX, MTBE, Lead, and Nitrate

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL NUMBER	DATE	TPHd (ppb)		TPHg (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	MTBE (10) (ppb)	TOTAL LEAD (ppm)		NITRATE (ppm)
MW3	06/04/91	2,600		31,000	640	ND	220	1,800		0.15	(1)	ND
	09/11/91	5,000		24,000	500	1,300	1,200	2,400		0.085	(1)	--
	10/18/91	NS		NS	NS	NS	NS	NS		NS	(1)	ND
	11/14/91	3,500		18,000	710	960	140	2,100		0.038	(1)	--
	03/11/92	3,900		9,900	550	300	38	1,000		0.043	(1)	--
	06/18/92	ND		11,000	570	58	18	770		ND	(1)	23
	09/04/92	ND		18,000	1,600	76	53	1,200		0.15	(1)	--
	11/12/92*	ND		14,000	ND	40	440	2,300		ND	(1)	ND
	03/25/93	6,200		6,500	290	27	380	720		0.012	(1)	--
	06/15/93	20,000		8,100	640	50	540	890		0.022	(1)	ND
	08/17/93	8,800		5,900	660	23	21	460		ND	(1)	ND
	12/14/93	980		7,700**	970**	35**	420**	590**		ND		--
	03/14/94	2,600		11,000	690	37	480	750		ND	(1)	ND
	05/17/94	1,200		3,900	420	13	180	240		ND		ND
	07/06/94	2,500	(2)	11,000	1,200	32	300	360		ND		ND
	11/30/94	2,400	(2)	11,000	870	43	410	770		ND		--
	03/03/95	ND		ND	ND	ND	ND	ND		ND		--
	05/18/95	660		2,100	120	9.1	120	120		ND		--
	09/27/95	2,500		9,200	1,100	35	360	280***		0.0059		--
	11/21/95	2,100		9,800	1,000	ND	350	270		0.0062		--
	03/28/96	330		1,400	160	7.1	77	90		ND		--
	5/9/1996	960		2,100	410	21	220	220		0.081		--
	8/16/1996	1,700	(4)	4,300	680	18	170	150		ND		--
	12/12/1996	810		3,500	120	9	220	320		ND		--
	3/5/1997	500	(6)	2,600	320	15	130	110		ND		--
	6/27/1997	800	(6)	1,400	95	ND	44	60		ND		--
	9/30/1997	1,200	(6)	10,000	1,100	ND	140	98		ND		--
	12/18/1997	2,200	(6)	8,400	380	50	350	490		ND		--
	3/17/1998	210	(6)	1,300	100	5.9	41	75		ND		--
	6/30/1998	1,000	(6)	2,200	300	11.0	91	150		ND		--
	9/18/1998	1,400	(6)	3,000	580	13	120	160		ND		--
	3/17/1999	230	(6)	590	75	2.4	25	40	34	ND		--
	9/20/1999	1,600	(6), (9)	5,200	450	14	140	150	200	ND		--
	3/28/2000	212	(6), (9)	1,120	117	5.24	51.8	59.9	6.98 (11)	ND		--
	10/12/2000	890	(12)	4,400	520	6.7	51	48	170	ND		ND
	3/27/2001	630	(12)	810	240	ND	ND	9	ND	ND		--
	9/27/2001	930	(13)	6,900	360	ND	180	45	--	ND		--
	3/23/2002	420	(13)	340	34	1.3	0.99	5.9	--	ND		--
	9/26/2002	80	(13)	3,300	500	ND	32	29	--	--		--
	3/31/2003	100	(13)	420	35	1.6	15	20	--	--		--
	9/29/2003	910		4,000	360	8.5	12	13	ND	ND		--

Historical Summary of Groundwater Analytical Results for TPH, BTEX, MTBE, Lead, and Nitrate

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL NUMBER	DATE	TPHd (ppb)	TPHg (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	MTBE (10) (ppb)	TOTAL LEAD (ppm)	NITRATE (ppm)
MW4	07/07/94	ND	ND	ND	ND	ND	ND		ND	5.0
	11/29/94	ND	ND	ND	ND	ND	ND		ND	--
	03/03/95	ND	ND	ND	ND	ND	ND		ND	--
	05/18/95	ND	ND	ND	ND	ND	ND		ND	--
	09/27/95	55	ND	ND	ND	ND	ND		ND	--
	11/20/95	57	ND	ND	ND	ND	ND		ND	--
	03/27/96	ND	ND	ND	ND	ND	ND		--	--
	5/9/1996	ND	ND	ND	ND	ND	ND		--	--
	8/19/1996	ND	ND	ND	ND	ND	ND		--	--
	12/13/1996	59	ND	ND	ND	ND	ND		--	--
	3/4/1997	ND	ND	ND	ND	ND	ND		--	--
	6/27/1997	ND	ND	ND	ND	ND	ND		--	--
	9/29/1997	ND	ND	ND	ND	ND	ND		--	--
	12/17/1997	ND	ND	ND	ND	ND	ND		--	--
	3/16/1998	ND	ND	ND	ND	ND	ND		--	--
	6/29/1998	ND	ND	ND	ND	ND	ND		--	--
	9/17/1998	50	ND	ND	ND	ND	ND		--	--
	9/29/2003	ND	ND	ND	ND	ND	ND		ND	--
MW5	07/07/94	ND	ND	ND	ND	ND	1.0		ND	12
	11/30/94	ND	ND	ND	ND	ND	ND		ND	--
	03/02/95	ND	ND	ND	ND	ND	ND		ND	--
	05/18/95	ND	ND	ND	ND	ND	ND		ND	--
	09/28/95	ND	ND	ND	ND	ND	ND		ND	--
	11/20/95	ND	ND	ND	ND	ND	ND		ND	--
	03/28/96	ND	ND	ND	ND	ND	ND		--	--
	5/10/1996	ND	ND	ND	ND	ND	ND		--	--
	8/19/1996	ND	ND	ND	ND	ND	ND		--	--
	12/13/1996	ND	ND	ND	ND	ND	ND		--	--
	3/4/1997	ND	ND	ND	ND	ND	ND		--	--
	6/27/1997	ND	ND	ND	ND	ND	ND		--	--
	9/29/1997	ND	ND	ND	ND	ND	ND		--	--
	12/17/1997	ND	ND	ND	ND	ND	ND		--	--
	3/16/1998	ND	ND	ND	ND	ND	ND		--	--
	6/29/1998	ND	ND	ND	ND	ND	ND		--	--
	9/17/1998	ND	ND	ND	ND	ND	ND		--	--

Historical Summary of Groundwater Analytical Results for TPH, BTEX, MTBE, Lead, and Nitrate

Former Unocal Bulk Plant No. 1975

1051 Spencer Avenue

Santa Rosa, California

WELL NUMBER	DATE	TPHd (ppb)		TPHg (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	MTBE (10) (ppb)	TOTAL LEAD (ppm)	NITRATE (ppm)
MW6	07/07/94	ND		ND	ND	ND	ND	ND		ND	11
	11/29/94	ND		ND	ND	ND	ND	ND		ND	--
	03/03/95	ND		ND	ND	ND	ND	ND		ND	--
	05/18/95	ND		ND	ND	ND	ND	ND		ND	--
	09/27/95	ND		ND	ND	ND	ND	ND		ND	--
	11/20/95	ND		ND	ND	ND	ND	ND		ND	--
	03/27/96	ND		ND	ND	ND	ND	ND		--	--
	5/10/1996	ND		ND	ND	ND	ND	ND		--	--
	8/19/1996	ND		ND	ND	ND	ND	ND		--	--
	12/13/1996	ND		ND	ND	ND	ND	ND		--	--
	3/4/1997	120	(6)	ND	ND	ND	ND	ND		--	--
	6/27/1997	ND		ND	ND	ND	ND	ND		--	--
	9/29/1997	ND		ND	ND	ND	ND	ND		--	--
	12/17/1997	ND		ND	ND	ND	ND	ND		--	--
	3/16/1998	ND		ND	ND	ND	ND	ND		--	--
	6/29/1998	ND		ND	ND	ND	ND	ND		--	--
	9/17/1998	NA	(7)	ND	ND	ND	ND	ND		--	--
	9/20/1999	55	(8), (9)	ND	ND	ND	ND	ND	4.1	--	--
	10/12/2000	64	(8)	ND	ND	ND	ND	ND	ND	--	--
	9/27/2001	ND		ND	ND	ND	ND	ND	--	--	--
	3/23/2002	ND		ND	ND	ND	ND	ND	--	--	--
	9/26/2002	ND		ND	ND	ND	ND	ND	--	--	--
MW7	07/06/94	ND		ND	ND	ND	ND	ND		ND	19
	11/29/94	ND		ND	ND	ND	ND	ND		ND	--
	03/03/95	ND		ND	ND	ND	ND	ND		ND	--
	05/17/95	ND		ND	0.89	ND	ND	2.3		ND	--
	09/27/95	ND		ND	ND	ND	ND	ND		ND	--
	11/20/95	ND		ND	ND	ND	ND	ND		ND	--
	03/28/96	ND		ND	ND	ND	ND	ND		--	--
	5/10/1996	ND		ND	ND	ND	ND	ND		--	--
	8/19/1996	ND		ND	ND	ND	ND	ND		--	--
	12/13/1996	ND		ND	ND	ND	ND	ND		--	--
	3/4/1997	ND		ND	ND	ND	ND	ND		--	--
	6/27/1997	ND		ND	ND	ND	ND	ND		--	--
	9/29/1997	ND		ND	ND	ND	ND	ND		--	--
	12/18/1997	ND		ND	ND	ND	ND	ND		--	--
	3/16/1998	ND		ND	ND	ND	ND	ND		--	--
	6/29/1998	ND		ND	ND	ND	ND	0.55		--	--
	9/17/1998	NA	(7)	ND	ND	ND	ND	0.55		--	--
	9/20/1999	51	(8), (9)	ND	ND	ND	ND	ND	3.8	--	--
	10/12/2000	ND		ND	ND	ND	ND	ND	ND	--	--
	9/27/2001	ND		ND	ND	ND	ND	0.55	--	--	--
	3/23/2002	ND		ND	ND	ND	ND	ND	--	--	--
	9/26/2002	ND		ND	ND	ND	ND	ND	--	--	--
	9/29/2003	ND		ND	ND	ND	ND	ND	ND	--	--

Historical Summary of Groundwater Analytical Results for TPH, BTEX, MTBE, Lead, and Nitrate

Former Unocal Bulk Plant No. 1975

1051 Spencer Avenue

Santa Rosa, California

WELL NUMBER	DATE	TPHd (ppb)		TPHg (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	MTBE (10) (ppb)	TOTAL LEAD (ppm)	NITRATE (ppm)
MW8	07/07/94	ND		ND	ND	ND	ND	ND		ND	17
	11/30/94	ND		ND	ND	ND	ND	ND		ND	--
	03/03/95	ND		ND	ND	ND	ND	ND		ND	--
	05/17/95	81		ND	ND	ND	ND	ND		ND	--
	09/28/95	ND		ND	ND	ND	ND	ND		ND	--
	11/21/95	ND		ND	ND	ND	ND	ND		ND	--
	03/27/96	ND		ND	ND	ND	ND	ND		--	--
	5/10/1996	ND		ND	ND	ND	ND	ND		--	--
	8/19/1996	ND		ND	ND	ND	ND	ND		--	--
	12/13/1996	ND		ND	ND	ND	ND	ND		--	--
	3/4/1997	ND		ND	ND	ND	ND	ND		--	--
	6/27/1997	ND		ND	ND	ND	ND	ND		--	--
	9/29/1997	ND		ND	ND	ND	ND	ND		--	--
	12/17/1997	ND		ND	ND	ND	ND	ND		--	--
	3/16/1998	ND		ND	ND	ND	ND	ND		--	--
	6/29/1998	ND		ND	ND	ND	1.2	ND		--	--
	9/17/1998	ND		ND	ND	ND	ND	ND		--	--
	9/20/1999	140	(8), (9)	ND	ND	ND	ND	ND	2.7	--	--
	10/12/2000	370	(8)	ND	ND	ND	ND	ND	ND	--	--
	9/27/2001	54	(13)	ND	ND	ND	ND	ND	--	--	--
	3/23/2002	ND		ND	ND	ND	ND	ND	--	--	--
	9/26/2002	ND		ND	ND	ND	ND	ND	--	--	--
	9/29/2003	ND		ND	ND	ND	ND	ND	ND	--	--
MW9	07/06/94	ND		ND	ND	ND	ND	ND		ND	10
	11/30/94	ND		ND	ND	ND	ND	ND		ND	--
	03/03/95	ND		ND	ND	ND	ND	ND		ND	--
	05/17/95	ND		ND	ND	ND	ND	ND		ND	--
	09/28/95	ND		ND	ND	ND	ND	ND		ND	--
	11/21/95	ND		ND	ND	ND	ND	ND		ND	--
	03/27/96	ND		ND	ND	ND	ND	ND		--	--
	5/10/1996	ND		ND	ND	ND	ND	ND		--	--
	8/19/1996	ND		ND	ND	ND	ND	ND		--	--
	12/13/1996	ND		ND	ND	ND	ND	ND		--	--
	3/4/1997	ND		ND	ND	ND	ND	ND		--	--
	6/27/1997	ND		ND	ND	ND	ND	ND		--	--
	9/29/1997	ND		ND	ND	ND	ND	ND		--	--
	12/17/1997	ND		ND	ND	ND	ND	ND		--	--
	3/17/1998	ND		ND	ND	ND	ND	ND		--	--
	6/29/1998	ND		ND	ND	ND	ND	ND		--	--
	9/17/1998	ND		ND	ND	ND	ND	ND		--	--
	9/20/1999	130	(8), (9)	ND	ND	ND	ND	ND	2.7	--	--
	10/12/2000	190	(8)	ND	ND	ND	ND	ND	ND	--	8.7
	9/27/2001	ND		ND	ND	ND	ND	ND	--	--	--
	3/23/2002	ND		ND	ND	ND	ND	ND	--	--	--
	9/26/2002	ND		ND	ND	ND	ND	ND	--	--	--
	9/29/2003	370		ND	ND	ND	ND	ND	ND	--	--

Historical Summary of Groundwater Analytical Results for TPH, BTEX, MTBE, Lead, and Nitrate

Former Unocal Bulk Plant No. 1975

1051 Spencer Avenue

Santa Rosa, California

WELL NUMBER	DATE	TPHd (ppb)		TPHg (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	MTBE (10) (ppb)	TOTAL LEAD (ppm)	NITRATE (ppm)
MW10	07/06/94	ND		ND	ND	ND	ND	ND		ND	ND
	11/30/94	ND		ND	ND	ND	ND	ND		ND	--
	03/02/95	ND		ND	ND	ND	ND	ND		ND	--
	05/18/95	ND		ND	ND	ND	ND	ND		ND	--
	09/28/95	ND		ND	ND	ND	ND	ND		ND	--
	11/20/95	ND		ND	ND	ND	ND	ND		ND	--
	03/28/96	ND		ND	ND	ND	ND	ND		ND	--
	5/9/1996	ND		ND	ND	ND	ND	ND		ND	--
	8/16/1996	ND		ND	ND	ND	ND	ND		ND	--
	12/13/1996	ND		ND	ND	ND	ND	ND		ND	--
	3/5/1997	ND		ND	ND	ND	ND	ND		ND	--
	6/27/1997	ND		ND	ND	ND	ND	ND		ND	--
	9/30/1997	140	(6)	ND	ND	ND	ND	ND		ND	--
	12/18/1997	UA		UA	UA	UA	UA	UA		UA	--
	3/17/1998	ND		ND	ND	ND	ND	ND		ND	--
	6/30/1998	ND		ND	ND	ND	ND	ND		ND	--
	9/19/1998	ND		ND	ND	ND	ND	ND		ND	--
	9/20/1999	55	(8), (9)	ND	ND	ND	ND	ND	3.5	ND	--
	10/12/2000	260	(8)	ND	ND	ND	ND	ND	ND	--	--
	9/27/2001	ND		ND	ND	ND	ND	ND	--	--	--
	3/23/2002	ND		ND	ND	ND	ND	ND	--	--	--
	9/26/2002	ND		ND	ND	ND	ND	ND	--	--	--
	9/29/2003	ND		ND	ND	ND	ND	ND	ND	--	--

Historical Summary of Groundwater Analytical Results for TPH, BTEX, MTBE, Lead, and Nitrate

Former Unocal Bulk Plant No. 1975

1051 Spencer Avenue

Santa Rosa, California

WELL NUMBER	DATE	TPHd (ppb)		TPHg (ppb)		BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	MTBE (10) (ppb)	TOTAL LEAD (ppm)	NITRATE (ppm)
MW11	07/07/94	1,600		2,100	(3)	ND	ND	ND	ND		ND	ND
	11/30/94	550	(2)	88		ND	ND	ND	ND		ND	--
	03/02/95	1200	(4)	ND		ND	ND	ND	ND		ND	- -
	05/17/95	620		ND		ND	ND	ND	ND		ND	--
	09/28/95	490		ND		ND	ND	ND	ND		ND	- -
	11/20/95	1,100		ND		ND	ND	ND	ND		ND	--
	03/28/96	660		ND		ND	ND	ND	ND		--	--
	5/9/1996	1300		63	(5)	ND	ND	ND	ND		ND	--
	8/16/1996	350	(4)	ND		ND	ND	ND	ND		ND	--
	12/13/1996	1,100		ND		ND	ND	ND	ND		ND	--
	3/5/1997	950	(6)	ND		ND	ND	ND	ND		ND	--
	6/27/1997	450	(6)	ND		ND	ND	ND	ND		ND	--
	9/30/1997	190	(6)	ND		ND	ND	ND	ND		ND	--
	12/18/1997	530	(6)	ND		ND	ND	ND	ND		ND	--
	3/17/1998	800	(6)	ND		ND	ND	ND	ND		ND	--
	6/30/1998	850	(6)	ND		ND	ND	ND	ND		ND	--
	9/18/1998	NA	(7)	ND		ND	ND	ND	ND		ND	--
	3/17/1999	850	(7)	ND		ND	ND	ND	ND	2.8	ND	--
	9/20/1999	330	(6), (9)	ND		ND	ND	ND	ND	ND	ND	--
	3/28/2000	1910	(6), (9)	ND		ND	ND	ND	ND	ND	ND	--
	10/12/2000	520	(8)	ND		ND	ND	ND	ND	ND	ND	ND
	3/27/2001	230	(8)	ND		ND	ND	ND	ND	ND	ND	--
	9/27/2001	300	(13)	ND		ND	ND	ND	ND	--	ND	--
	3/23/2002	290	(13)	ND		ND	ND	ND	ND	--	ND	--
	9/26/2002	13	(13)	ND		ND	ND	ND	ND	--	--	--
	3/31/2003	1300	(13)	ND		ND	ND	ND	ND	--	--	--
	9/29/2003	ND		ND		ND	ND	ND	ND	ND	ND	--

Historical Summary of Groundwater Analytical Results for TPH, BTEX, MTBE, Lead, and Nitrate

Former Unocal Bulk Plant No. 1975

1051 Spencer Avenue

Santa Rosa, California

WELL NUMBER	DATE	TPHd		TPHg	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENES	MTBE (10)	TOTAL LEAD	NITRATE
		(ppb)		*(ppb)*	*(ppb)*	*(ppb)*	*(ppb)*	*(ppb)*	*(ppb)*	*(ppm)*	*(ppm)*
MW12	07/06/94	ND		ND	ND	ND	ND	ND		ND	29
	11/30/94	ND		ND	ND	ND	ND	ND		ND	--
	03/03/95	ND		ND	ND	ND	ND	ND		ND	--
	05/18/95	ND		ND	ND	ND	ND	ND		ND	--
	09/27/95	ND		ND	ND	ND	ND	ND		ND	--
	11/21/95	ND		ND	ND	ND	ND	ND		ND	--
	03/27/96	ND		ND	ND	ND	ND	ND		--	--
	5/10/1996	ND		ND	ND	ND	ND	ND		--	--
	8/19/1996	ND		ND	ND	ND	ND	ND		--	--
	12/13/1996	ND		ND	ND	ND	ND	ND		--	--
	3/4/1997	ND		ND	ND	ND	ND	ND		--	--
	6/27/1997	ND		ND	ND	ND	ND	ND		--	--
	9/30/1997	ND		ND	ND	ND	ND	ND		--	--
	12/18/1997	ND		ND	ND	ND	ND	ND		--	--
	3/16/1998	ND		ND	ND	ND	ND	ND		--	--
	6/30/1998	ND		ND	ND	ND	ND	ND		--	--
	9/17/1998	ND		ND	ND	ND	ND	ND		--	--
	9/20/1999	57	(6), (9)	ND	ND	ND	ND	ND	ND	--	--
	10/12/2000	130	(8)	ND	ND	ND	ND	ND	ND	--	--
	9/27/2001	ND		ND	ND	ND	ND	ND	--	--	--
	3/23/2002	ND		ND	ND	ND	ND	ND	--	--	--
	9/26/2002	ND		ND	ND	ND	ND	ND	--	--	--
	9/29/2003	ND		ND	ND	ND	ND	ND	ND	--	--
DW-1	07/07/94	ND		ND	ND	ND	ND	ND		ND	7.3
	11/30/94	ND		ND	ND	ND	ND	ND		ND	--
	03/02/95	ND		ND	ND	ND	ND	ND		ND	--
	05/18/95	ND		ND	ND	ND	ND	ND		ND	--
	09/28/95	ND		ND	ND	ND	ND	ND		ND	--
	11/21/95	ND		ND	ND	ND	ND	ND		ND	--
	03/27/96	ND		ND	ND	ND	ND	ND		ND	--
	5/9/1996	ND		ND	ND	ND	ND	ND		ND	--
	8/16/1996	ND		ND	ND	ND	ND	ND		ND	--
	12/13/1996	ND		ND	ND	ND	ND	ND		ND	--
	3/5/1997	ND		ND	ND	ND	ND	ND		ND	--
	6/27/1997	ND		ND	ND	ND	ND	ND		ND	--
	9/30/1997	ND		ND	ND	ND	ND	ND		ND	--
	12/18/1997	ND		ND	ND	ND	ND	ND		ND	--
	3/17/1998	ND		ND	ND	ND	ND	ND		ND	--
	6/30/1998	ND		ND	ND	ND	ND	ND		ND	--
	9/18/1998	NA	(7)	ND	ND	ND	ND	ND		ND	--
tection Limits:		50		50	0.50	0.50	0.50	0.50		0.10	0.1

Historical Summary of Groundwater Analytical Results for TPH, BTEX, MTBE, Lead, and Nitrate

Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

WELL NUMBER	DATE	TPHd (ppb)	TPHg (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	MTBE (10) (ppb)	TOTAL LEAD (ppm)	NITRATE (ppm)

NOTES:

TPHd = Total Petroleum Hydrocarbons as Diesel.

TPHg = Total Petroleum Hydrocarbons as Gasoline.

ND = Not detected. See laboratory report for detection limits.

NS = Not sampled.

UA = Well was inaccessible.

-- = Analysis not performed.

* = Nitrates and lead sampled on December 2, 1992.

** = Analysis from wells resampled January 7, 1994.

*** = Xylene EPA 8240: MW-2: 5,100 ppb; MW-3: 310 ppb.

(1) = Detection Limit was 0.005 mg/L.

(2) = Laboratory reports chromatogram pattern as being "Non-Diesel < C18".

(3) = Laboratory reports chromatogram pattern as being "Non-Gas > C8".

(4) = Laboratory reports chromatogram pattern as being "Non-Diesel > C9".

(5) = Laboratory reports chromatogram pattern as being "Non-Gas > C11".

(6) = Laboratory reports unidentified hydrocarbon between C9 and C24.

(7) = Sample container broken in laboratory.

(8) = Laboratory reports unidentified hydrocarbon > C16.

(9) = Laboratory reports detectable levels of hydrocarbons in Method Blank.

(10) = MTBE results by EPA Method 8020. MTBE has never been confirmed at site by EPA Method 8260.

(11) = False detection of MTBE as confirmed by EPA Method 8260.

(12) = Laboratory reports unidentified hydrocarbon < C16.

(13) = Hydrocarbon pattern is present in the requested fuel quantitation range but does not resemble the pattern of the requested fuel.

Historical Summary of Groundwater Analytical Results
Volatile/Semivolatile Organics and Metals Analysis
September 29, 2003
Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

PARAMETER	UNITS	MW-2	MW-3	MW-4	MW-11
VOLATILES (EPA 8260)					
Benzene	ug/l	<12	360	<0.5	<0.5
n-Butylbenzene	ug/l	43	23	<0.5	<0.5
sec-Butylbenzene	ug/l	30	18	<0.5	<0.5
Ethylbenzene	ug/l	320	12	<0.5	<0.5
Isopropylbenzene	ug/l	140	89	<0.5	<0.5
Methylene chloride	ug/l	<12	< 5.0	<0.5	<0.5
Naphthalene	ug/l	210	< 5.0	<0.5	<0.5
n-Propylbenzene	ug/l	420	220	<0.5	<0.5
Styrene	ug/l	<12	< 5.0	<0.5	<0.5
Tetrachloroethene	ug/l	<12	< 5.0	<0.5	<0.5
Toluene	ug/l	<12	8.5	<0.5	<0.5
Trichloroethene	ug/l	<12	< 5.0	<0.5	<0.5
1,2,4-Trimethylbenzene	ug/l	<12	5.1	<0.5	<0.5
1,3,5-Trimethylbenzene	ug/l	<12	< 5.0	<0.5	<0.5
Total Xylenes	ug/l	21	13	<0.5	<0.5
SEMIVOLATILES (EPA 8270)					
2-Methylnaphthalene	ug/l	240	36	NA	NA
Naphthalene	ug/l	220	< 10	NA	NA
METALS					
Barium	mg/l	0.076	0.100	0.064	0.043
Chromium	mg/l	< 0.010	< 0.010	< 0.010	< 0.010
Cobalt	mg/l	< 0.007	< 0.007	< 0.007	< 0.007
Copper	mg/l	< 0.010	< 0.010	< 0.010	< 0.010
Nickel	mg/l	< 0.030	0.040	< 0.030	< 0.030
Selenium	mg/l	< 0.10	< 0.10	< 0.10	< 0.10
Thallium	mg/l	< 0.10	< 0.10	< 0.10	< 0.10
Vanadium	mg/l	< 0.010	< 0.010	< 0.010	< 0.010
Zinc	mg/l	< 0.020	< 0.020	< 0.020	< 0.020

NOTES:
< X = Constituents not present at or above method detection limits of X.
ug/l = Micrograms per liter.
mg/l = Milligrams per liter.
NA = Not Analyzed
No other VOCs, SVOCs, or Metals were detected

Table 4
Summary of Groundewater Analytical Results
Fuel Oxygenate Compounds by EPA Method 8260
Old Towne Subdivision, Santa Rosa, California

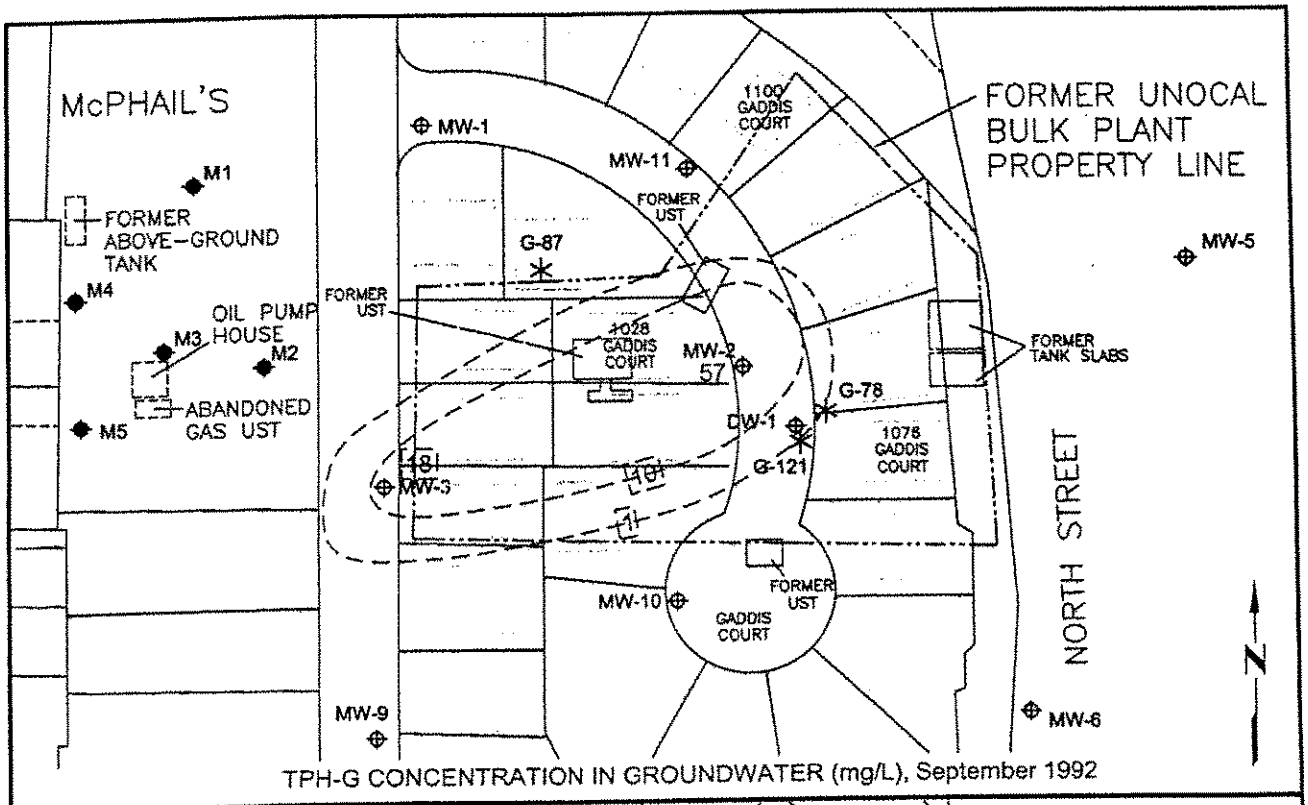
Well Number	Date	TAME (ppb)	TBA (ppb)	DIPE (ppb)	EDB (ppb)	1,2-DCA (ppb)	Ethanol (ppb)	ETBE (ppb)	MTBE (ppb)	Methanol (ppb)
MW-2	03/28/00	NA	NA	NA	< 5.00	< 5.00	NA	NA	< 5.00	NA
	03/27/01	< 2.0	< 50	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	NA
	09/27/01	< 100	< 2,000	< 100	< 100	< 100	< 10,000	< 100	< 100	NA
	03/23/02	< 2.0	< 20	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	<100
	09/26/02	< 25	< 250	< 25	< 25	< 25	< 2,500	< 25	< 25	NA
	03/31/03	< 25	< 250	< 25	< 25	< 25	< 2,500	< 25	< 25	NA
	09/29/03	< 25	<500	< 25	<12	<12	< 2,500	< 25	<12	NA
MW-3	03/28/00	NA	NA	NA	< 5.00	< 5.00	NA	NA	< 10.0	NA
	03/27/01	< 2.0	< 50	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	NA
	09/27/01	< 100	< 2,000	< 100	< 100	< 100	< 10,000	< 100	< 100	NA
	03/23/02	< 2.0	< 20	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	<100
	09/26/02	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 500	< 5.0	< 5.0	NA
	03/31/03	< 5.0	< 100	< 5.0	< 5.0	< 5.0	< 500	< 5.0	< 5.0	NA
	09/29/03	<10	<200	<10	< 5.0	<5	<1,000	<10	<5	NA
MW-6	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
MW-7	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	09/29/03	<0.5	<5	<0.5	<0.5	<0.5	<100	<0.5	< 0.50	NA
MW-8	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	09/29/03	<0.5	<5	<0.5	<0.5	<0.5	<100	<0.5	< 0.50	NA
MW-9	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	09/29/03	<0.5	<5	<0.5	<0.5	<0.5	<100	<0.5	< 0.50	NA
MW-10	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	09/29/03	<0.5	<5	<0.5	<0.5	<0.5	<100	<0.5	< 0.50	NA
MW-11	03/28/00	NA	NA	NA	< 5.00	< 5.00	NA	NA	< 1.00	NA
	03/27/01	< 2.0	< 50	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	NA
	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	03/23/02	< 2.0	< 20	< 2.0	< 2.0	< 2.0	< 500	< 2.0	< 2.0	<100
	09/26/02	< 0.50	< 5.0	< 0.50	< 0.50	< 0.50	< 50	< 0.50	< 0.50	NA
	03/31/03	< 1.0	< 20	< 1.0	< 1.0	< 1.0	< 100	< 1.0	< 1.0	NA
	09/29/03	<1	<20	<1	< 0.50	< 0.50	<100	<1	< 0.50	NA
MW-12	09/27/01	< 1.0	< 20	< 1.0	< 0.50	< 0.50	< 100	< 1.0	< 0.50	NA
	09/29/03	<0.5	<5	<0.5	<0.5	<0.5	<100	<0.5	< 0.50	NA

NOTES:

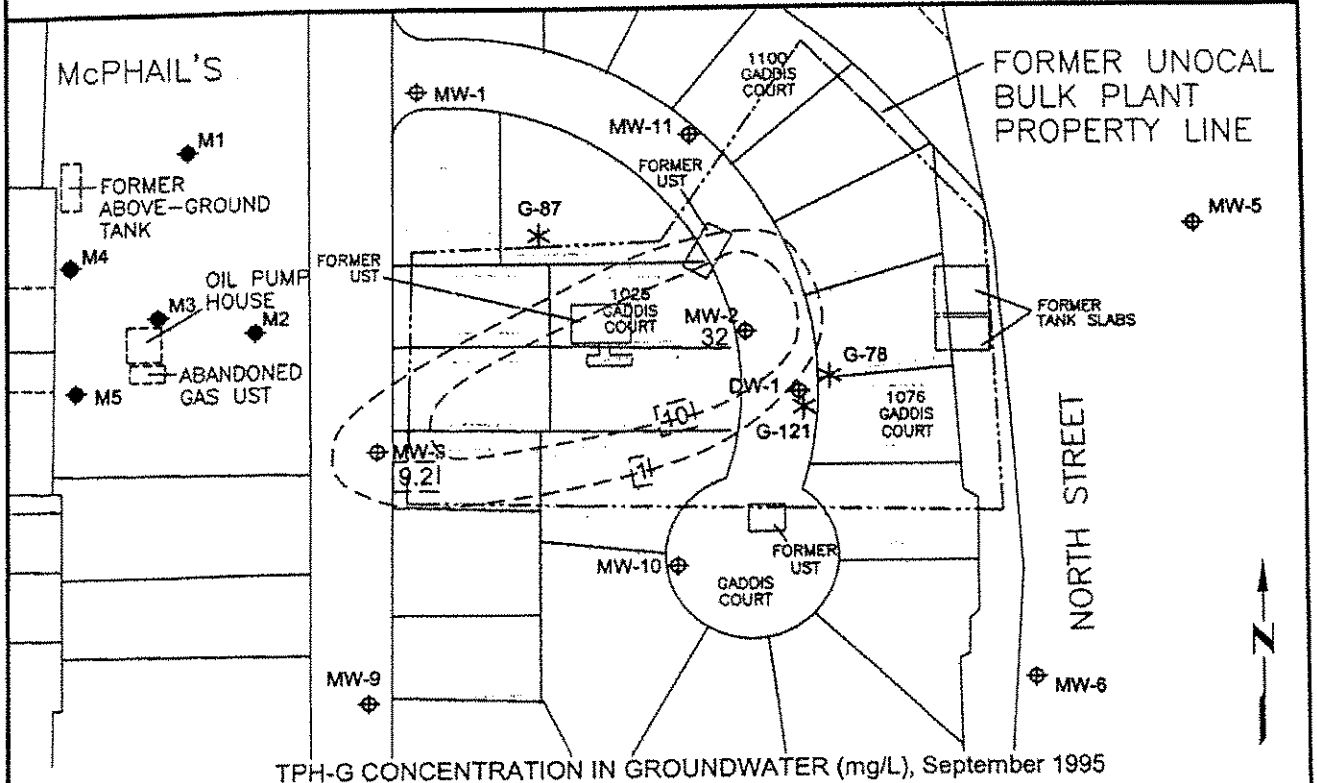
TAME = Tert-amyl methyl ether
TBA = Tert-butyl alcohol
DIPE = Di-isopropyl ether
EDB = 1,2-Debromoethane
1,2-DCA = 1,2-Dichloroethane
ETBE = Ethyl tert-butyl ether
MTBE = Methyl tert-butyl ether
NA = Not analyzed

APPENDIX C

Historical Groundwater Concentration Summary Figures and Graphs



TPH-G CONCENTRATION IN GROUNDWATER (mg/L), September 1992



TPH-G CONCENTRATION IN GROUNDWATER (mg/L), September 1995

LEGEND

- EXISTING MONITORING WELL (BY MITTELHAUSER)
- EXISTING MONITORING WELL (BY OTHERS)
- FORMER GADDIS WELLS (WITH WELL DEPTH)
- TPHG ISOCONCENTRATION CONTOUR (in mg/L)

HISTORICAL COMPARISON TPHG in GROUNDWATER, SEPTEMBER 1992 AND 1995

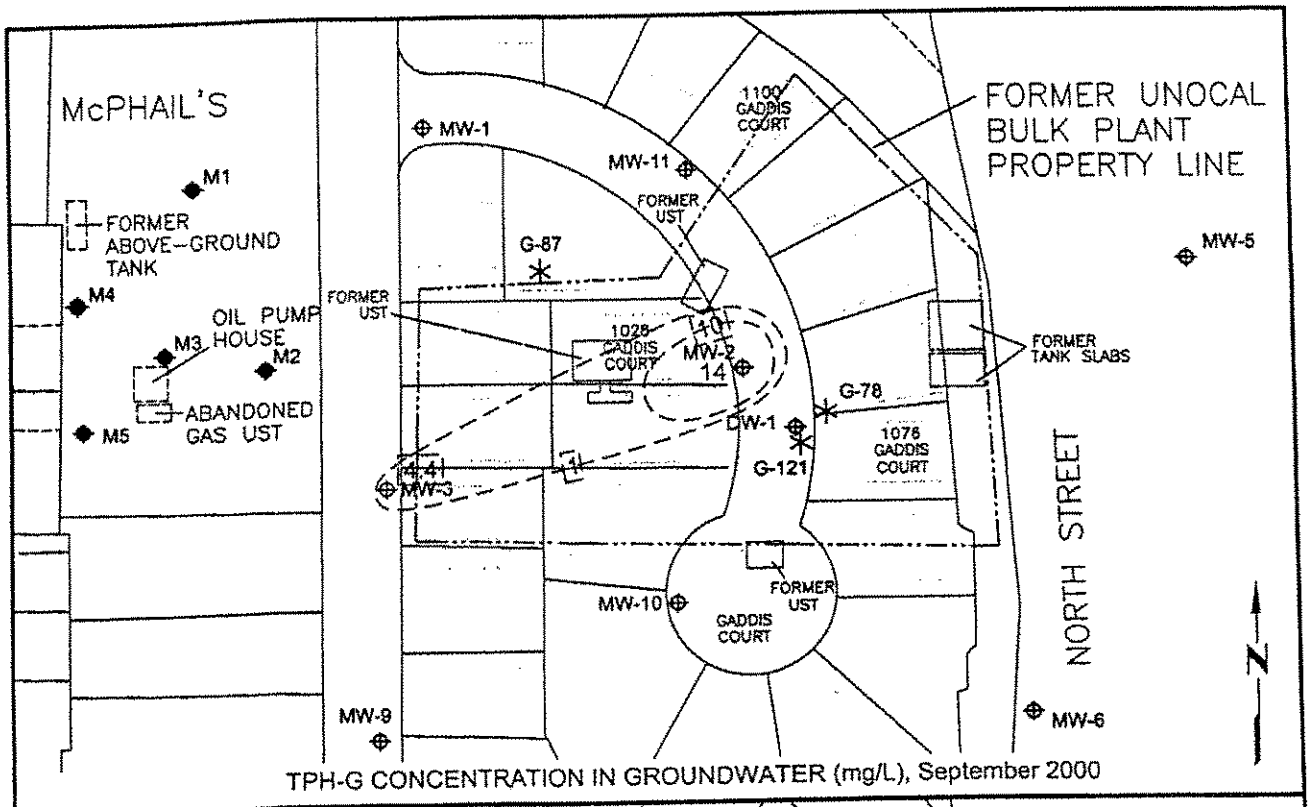
OLD TOWNE SUBDIVISION
1051 SPENCER AVENUE
SANTA ROSA, CALIFORNIA
Clayton Project No. 70-98305.00

Figure

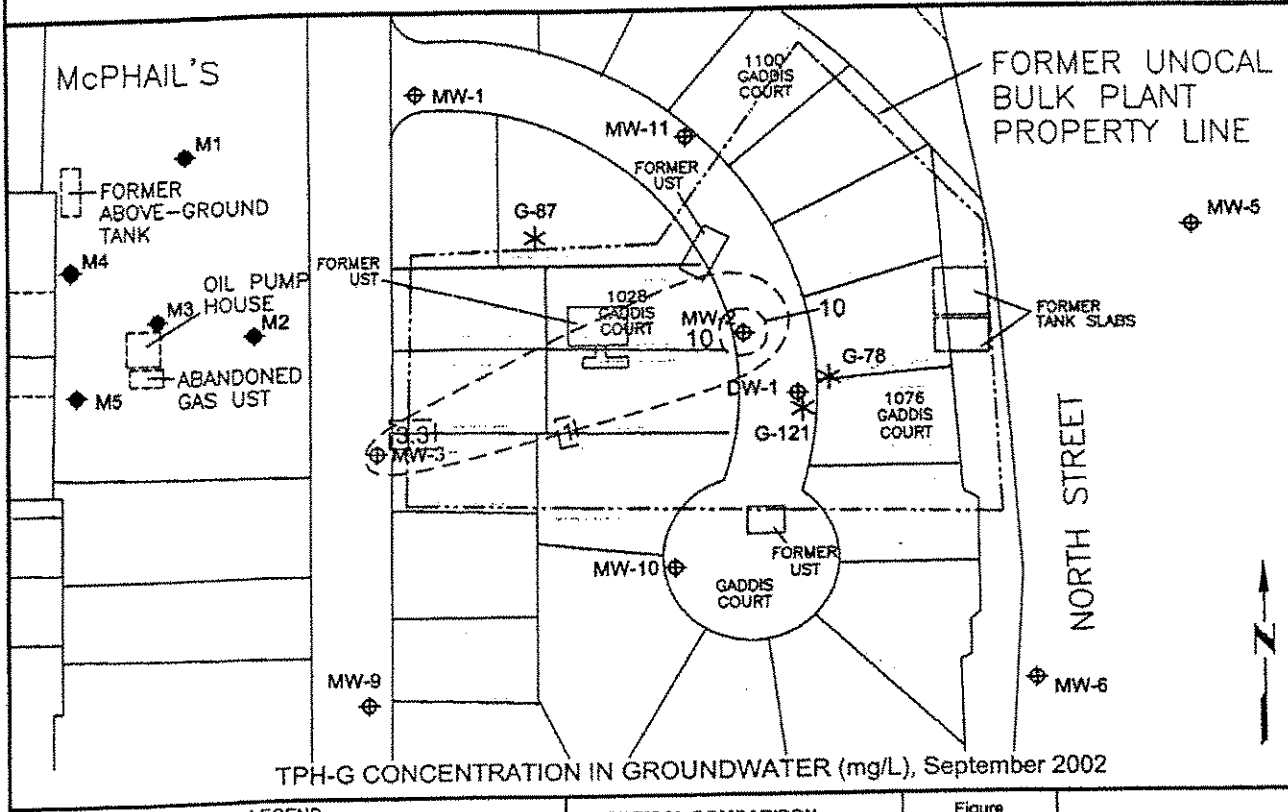
7A

02/17/03
TPH-0203.DWG

Clayton GROUP SERVICES



TPH-G CONCENTRATION IN GROUNDWATER (mg/L), September 2000



TPH-G CONCENTRATION IN GROUNDWATER (mg/L), September 2002

LEGEND

- EXISTING MONITORING WELL (BY MITTELHAUSER)
- EXISTING MONITORING WELL (BY OTHERS)
- FORMER GADDIS WELLS (WITH WELL DEPTH)
- TPHG ISOCONCENTRATION CONTOUR (in mg/L)

HISTORICAL COMPARISON TPHG in GROUNDWATER, SEPTEMBER 2000 AND 2002

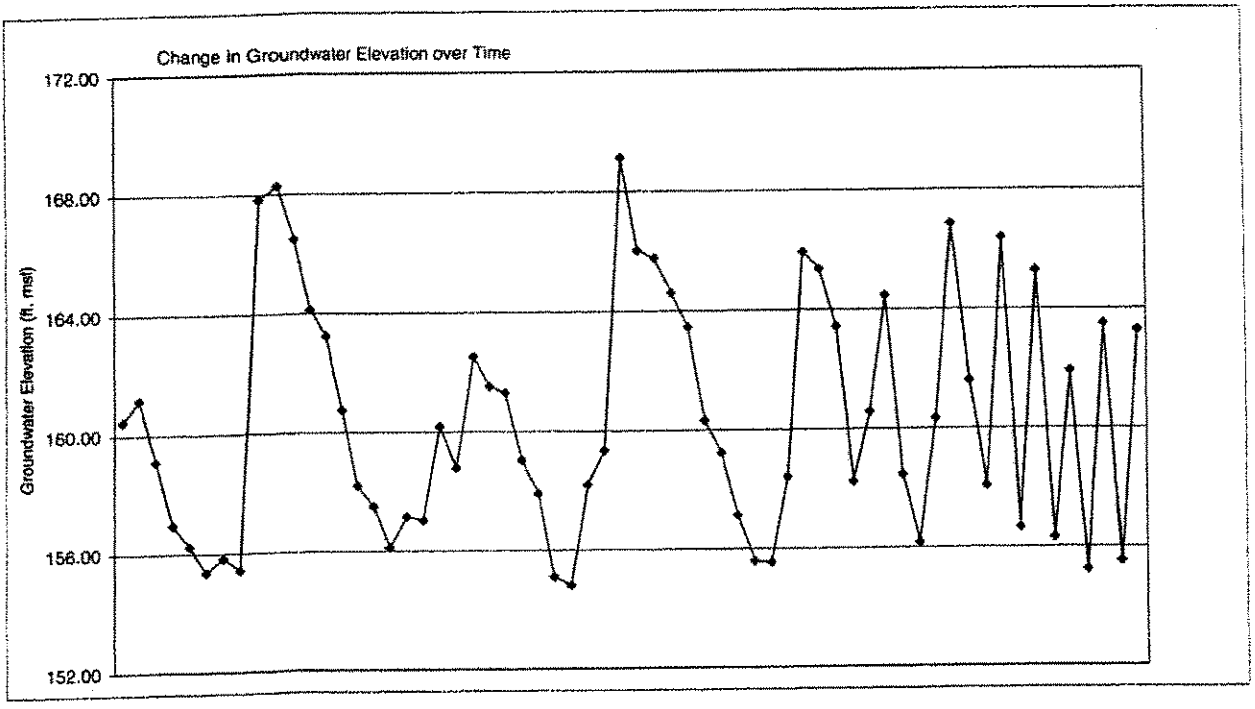
OLD TOWNE SUBDIVISION
1051 SPENCER AVENUE
SANTA ROSA, CALIFORNIA
Clayton Project No. 70-98305.00

Figure 7B

02/17/03
TPH-0203.DWG

Clayton GROUP SERVICES

FIGURE 8
MONITORING WELL MW-2
HISTORICAL GROUNDWATER DATA



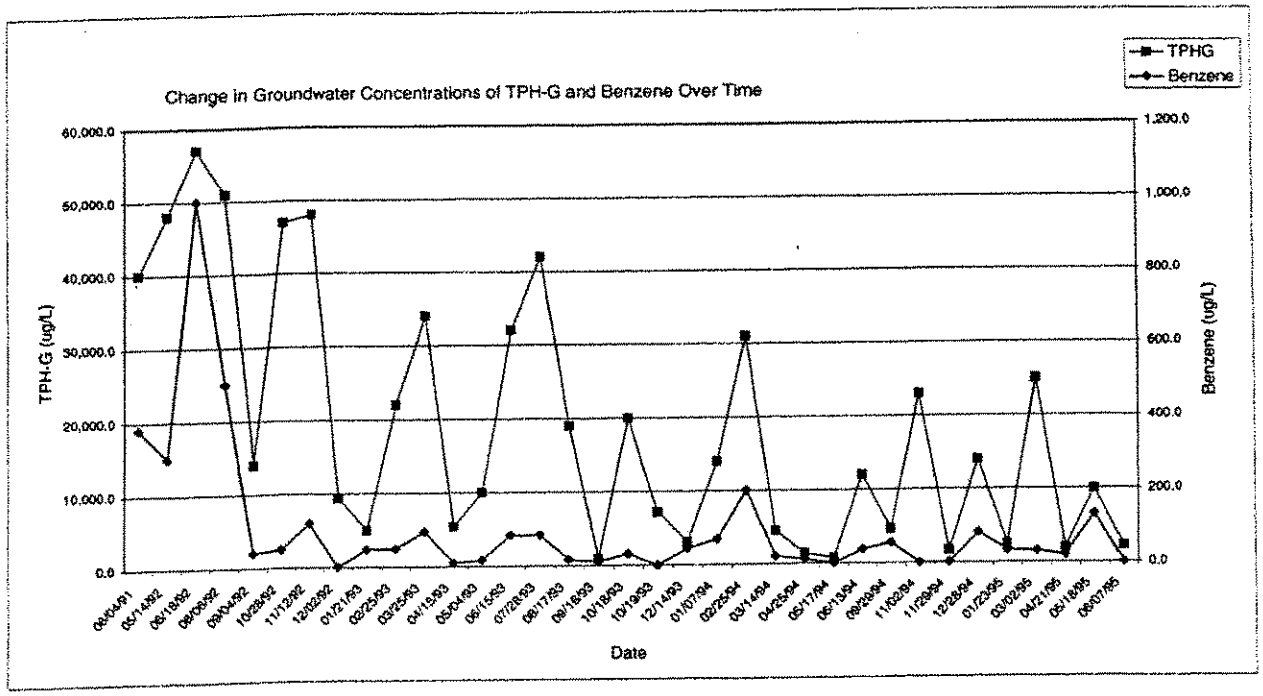


FIGURE 9
MONITORING WELL MW-3
HISTORICAL GROUNDWATER DATA